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Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY

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Guaranteed Circulation This Issue
10,062 of Which 9,540 Is Paid

Stromberg-Carlson

HOLD	LINE 1	LINE 2	FUTURE	INTER-COM	SIGNAL
HOLD	LINE 1	LINE 2	LINE 3	INTER-COM	SIGNAL
HOLD	LINE 1	LINE 2	FUTURE	FUTURE	LOCAL
HOLD	LINE 1	LINE 2	LINE 3	FUTURE	LOCAL
HOLD	LINE 1	LINE 2	LINE 3	LINE 4	LOCAL
HOLD	LINE 1	LINE 2	LINE 3	LINE 4	LINE 5
LINE 1	LINE 2	LINE 3	LINE 4	LINE 5	LINE 6

The telephone of the "6K System" is the newest member of the "1500" series, incorporating the new handset, the extended number plate and the new ringer with its factory-assembled matched capacitor.

The possible variations of the "6K System" are indicated in this chart. Note the "Signal" buttons (used with any auxiliary buzzer) and the "Future" designation, showing provision for growth up to the capacity of the instrument. The "Hold" function operates on any line and, in fact, can hold 2, 3 or 4 lines all at once!

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FLASHES AND PLUGS

SUNSHINE ON A LINE. The Chicago *Tribune's* writer, Norma Lee Browning, in a recent article on telephone operators entitled "Switchboard Samaritans," told of a case which involved a blind man who had "operator privilege." That is, the man dialed operator, gave his name, and the operator did his dialing for him.

The girls in the office where the blind man's calls were handled, got to know him and took up a collection to buy him a guide dog. In appreciation he went over to the office to meet and thank the girls personally.

This was the beginning of a telephone romance, climaxed a few months later by a wedding.

The bridegroom was the blind man; his bride was his favorite switchboard heroine.

• • •

PREPAREDNESS. In Schwalenberg, Germany, a construction company recently advertised an offer to produce on order "atom-proof" shelters with built-in radio, light, telephone, heat and Geiger counter. The price was $4,671.90.

• • •

INSIDE JOB. In Madison, Wis., a baby sitter recently put in an emergency call to police. She told them she heard a prowler knocking on the side of the house.

The police arrived soon afterward. They found the sitter's young charge bumping its head against its crib.

• • •

MYSTERY. In Wapping, Conn., an 8-year-old boy called to his father, "Dad, you're wanted on the telephone."

"Who is it?" the parent replied.

"I dunno," the youngster said. "It's still ringing."

• • •

ADD SEDATIVES. A Dallas, Tex., woman telephoned a local tax expert, just before the Ides of March deadline and wanted to know whether she could deduct her beer bill from her income.

"It's the only thing that will put me to sleep," she explained.

• • •

COMEUPPANCE. A school hall at Omaha, Neb., was packed with people waiting to see a memory expert from New York, who "could repeat anything after a casual glance at it."

His agent telephoned to say that the memory wizard had forgotten the engagement.

CIRCULATION

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May 8, 1954

Contents

THE WASHINGTON OUTLOOK FOR PUBLIC UTILITIES 17
By Francis X. Welch

THE PLANT MAN'S NOTEBOOK 21
By Ray Blain

MAINTENANCE TESTING EQUIPMENT—Part 71 22
By John A. Bracken

COURTS AND COMMISSIONS 24

BUSINESS LEADERS MEMBERS OF OHIO TELEPHONE SERVICE GROUP 32
By Weldon W. Case

REA APPROVES $1,649,000 FOR SIX LOANS 35

NEWS ON NEW PRODUCTS 38

H. D. FARGO Jr., *President & Advertising Manager*
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The Washington Outlook For Public Utilities

By FRANCIS X. WELCH
TELEPHONY'S Washington Editor

IT IS ALWAYS a pleasure, as well as an honor, to be invited in my capacity as a Washington observer to discuss matters of mutual interest with my good friends in the telephone industry. I say that advisably, because there is a certain amount of real satisfaction in discussing government and business relations with those who are responsible for the conduct of one of our nation's most essential services. So often, in the day-to-day performance of our appointed task, we have a tendency to overlook the real importance of the work we do, or at least take it for granted.

I know that I do not have to labor the point before this audience that the public utility business is important. But I would like to stress that this very importance carries with it a responsibility for everyone thus engaged in public service. It brings them into closer contact with the great masses of the people, as compared with other lines of business. By the same token, it makes us vulnerable to criticism and even to attack from political quarters.

And that, in turn, spotlights the importance of a successful relationship between our business and our government and the general public served by both. This is a responsibility of all business, utility and non-utility, as well as all units within our utility industry, whether large or small. Whether we realize it or not, indeed, whether we like it or not, there is inescapable community of interest between the welfare and success of every form of legitimate business which goes to make up the sum total of what we call our enterprise system.

We might find a comparable example in the preparation or trial of rate cases with which you are all familiar. You are all aware, I am sure, that every utility company's rate case is a precedent for other rate cases to follow. So when one company's rate case fails or collapses, either because of poor preparation, sloppy trial, or other reasons for which it may not even have been able to control, the result is to make it that much more difficult for other companies later on.

Government Relationship Same

Now, it is pretty much the same story in the more general field of public utility relationship with government. The public utility is something of a paradox in our American enterprise system. On the other hand, the utility does admittedly have a publicly regulated territorial monopoly and, therefore, it is not competitively engaged in "free enterprise" in the same way that a non-utility business is. On the other hand, the utility business is the first trench, or bulwark, protecting the enterprise system as a whole.

Time and again the history of other nations has shown us that whenever the forces of government encroachment or state socialism have invaded or taken over private business, the first breach has nearly always been made in the field of public utilities. After they were swallowed up, heavy industries—such as steel and mining—were exposed to attack; and eventually other forms of business.

We have seen that pattern worked out in Great Britain under the Labor Socialist Party. But it is by no means a new pattern. Socialism exists in a number of European countries today—such as in France—largely because it was started, kept alive, and nourished through the early acquisition of public utility services.

I know there are a lot of sincere people who try to make a distinction between socialism and public ownership of utilities, but history simply does not bear them out.

But, getting back to our basic question of the business-government relationship, what is the formula for success? I only wish I knew. I would be a very wise man if I did. Yet, with all due humility, I would like to venture the opinion that there is no set formula. It is a challenging and never-ending task requiring constant change, flexibility, and resourcefulness on the part of the best brains that industry can mobilize, at the executive level, at the state capital level, at the Washington level, and, most important, at the grass roots of field operation.

A little later, I shall particularize some of the problems. But first I would like to discuss, briefly, the general spirit of the approach which is most likely to gain a sympathetic recognition of your industry's needs. Now, I have noticed over the years that when representatives of business go to Washington they often find themselves maneuvered into a negative position—into a position of being generally *against* things.

Excise Tax an Example

Recently, in Congress, the telephone industry had to demonstrate that the excise taxes on telephone business were too high and so it was *against* these taxes.

Another bill of interest involved a corrective interpretation of the jurisdiction of the Federal Communications Commission, and so the industry had to be *against* that.

Some Independent companies complain that any increase in the minimum hourly wage would unduly burden them, and so they have to appear *against* that.

At the state regulatory commission level, utility companies are finding that present rates are inadequate, and so they are *against* those rates. They want them changed so as to increase revenues.

An address given before the recent Illinois Telephone Association convention in Peoria

All these attitudes are perfectly understandable and, in most cases, may be fully justified. But I put it to you that an industry forced to take this line of argument has been maneuvered into a negative position. It creates an impression on the mind of the average man on the street that our public utility companies are always against something. This average man may ask, "Why can't they be for something? Why can't they be positive and constructive, and in favor of progressive developments?"

Now, I do not have to tell you that is an unfair and unfounded reaction. Yet, such is the attitude that must be dealt with, as a practical matter, in present-day business-government relations. It means that our business leaders must constantly explore the possibility of stressing positive values.

We know, of course, that we do have plenty of positive values in the telephone business—well established and capable of demonstration beyond doubt. Therefore, the task is to create in the public mind an impression or attitude that utilities are primarily interested in serving the public, and in constantly improving that service so as to bring it to more and more people in greater and better quantities.

I realize that is exactly what Independent and Bell telephone companies have been trying to do in their publicity and in their arguments before commissions, courts, and committees ever since the postwar inflation has made it necessary for them to get out and scratch for more and more revenue. I am glad to see the United States Independent Telephone Association taking such a long forward step, recently announced, as the public information program of which you are all well aware. My purpose today is mainly to urge upon you the importance of supporting such measures.

Tax Cut Helps Public

After all, there are many positive and very human elements which can be stressed in all the proper requirements of your telephone companies. When you ask for tax relief, who is the real beneficiary, if it is not the telephone-using public? It is they who must pay the tax, although they might not realize it. The same is true with respect to representations that must be made in the matter of seeking necessary rate increases. The public is the beneficiary in the long run.

Now, I realize that it is a tough job to convince the average subscriber that you are doing him a favor by taking more money away from him for his monthly service. Yet, as surely as he values that service, and as surely as he would have to do without it if the company could not operate profitably, or could not attract enough capital to build and expand necessary plant, you are doing him a favor when you ask for required rate increases. Trying to make that argument understood, let alone making it stick, is one of the most challenging tasks that has ever confronted any business.

It might be that a good beginning can be made if we could get rid of the old fiction that every rate case is like a lawsuit, in which the interest of two parties is found to be in diametrical conflict—so that the adversaries must battle it out before the court in order to arrive at a just solution.

What I am trying to underline for you is the desirability of stressing the advantages of a spirit of cooperation between business and the consumer in the over-all public interest. What is true about regulatory proceedings is just as true at the legislative or congressional level. There is a danger, in fact I think it has already been demonstrated, that the public utility industries can be maneuvered into a partisan position.

By that I mean that there is a definite risk that the public will somehow get the impression that one of our great political parties is pro-utility and another is anti-utility. That is exactly what happened in Great Britain and it could happen here if one of our major parties ever got firmly committed to a position of hostility to public utility business. Whenever such a party were elected to power, there would invariably be a tendency to retaliate against what the political competition stood for.

People Not Anti-Business

Of course, we know that the utility's position with relation to the public is not as simple as all that. But such is the danger of having all industrial eggs in one political basket. It is an invitation to retaliation in the form of "guilt by association," so to speak, whenever the opposition wins a general election. I say it is a danger because I do not think there would be the slightest doubt about the wishes of a vast majority of the American people if the merits of some of these anti-business policies were put to them directly for a "yes" or "no" answer. If the American voters were ever asked specifically about putting their government in the electric power business, the telephone business, the railroad business, we would not have to fear what the answer would be.

But that is not how things are done along this line. Socialism always makes its best progress by a process of camouflage, deception, and subterfuge.

I am not going to take your time here to go into a review of the record of our federal government in the electric power field, which was primarily launched under such labels as flood control, navigation and irrigation improvements, aid to farmers, etc., but which subsequently became such out and out ventures into the electric power business that today nobody can fail to see the real character of them.

Socialism is thus able to make progress by aligning itself with a number of social objectives, the sum total of which might command the endorsement, in any given election, of a majority of the voters. That is why it is so important that the public utilities become so articulate about their program for public service as to command understanding, respect, and confidence in both of our great parties.

You know, I am sure, that there is no such thing as a Democratic public utility or a Republican public utility. Public service knows no politics. And if these simple truths were put to the people and to the leading element in both parties, there would be an understanding of the true position of the public utility.

Two-Party System an Aid

Now, it is one of the very difficult tasks of articulation which the utilities must accomplish. But it can be done because we, in this country, still have a well-balanced two-party system.

One of the reasons why our American democracy has worked better and lasted longer than it has in some other countries, is the very existence of responsible elements among the leadership of both of our great political parties.

Sometimes we hear very zealous and intelligent people express impatience over the factionalism that exists within our Democratic party and within our Republican party. In all sincerity, they wonder why these parties cannot be realigned, so that the left-wingers

would all be in one camp and the right-wingers in another.

I only hope that never happens because if it does it will be the end of responsible democracy as we know it. The main trouble with that idea (of trying to separate the left from the right) is that there are more than two sides to most problems. Carry that idea to its logical conclusion and we would end up having not only two parties but a half-dozen or more, each representing a particular economic point of view.

We need only to look at the stalemates and irresponsibility of government by blocs and compromise in so-called democratic parliaments in Europe to realize that that is not for us. In our two-party system, with all ts internal bickering, each party has .he strength of representative responsibility within itself. Therein will lie the salvation of our free enterprise system as long as that balance can be maintained.

Our American system has always been based on a respect for the residual good sense of the average man. The task of informing the electorate is not one that can be shirked with pious platitudes about business keeping out of politics. We must face the facts of life. One of these is that the public utility industries, all of them, have irretrievably been thrust into politics by the events of the past few decades. They probably will remain at or near the center of a continuing political whirlwind over which the pressures rise and fall. They will survive to the extent that they can command the understanding and confidence of a majority in both parties. This is an educational process that cannot be accomplished in any other way except by being articulate in the fullest sense of the word.

Flexibility Required

Another characteristic of successful business-government relations is the quality of being adjustable. As you know, our system of commission regulation is not the only way to regulate utilities. The history of regulation in some foreign countries gives us examples of different regulatory systems which have seemed reasonable and, for a time, worked pretty well.

Where are they today? Sooner or later they have failed, and in my opinion they have generally failed because they were inflexible.

In some South American countries, for example, utility rates have been fixed by government fiat on a sort of a concession basis. The minister of interior or some other administrative official fixed rates on the basis of contract bargaining between the government in office and foreign investors.

Over in England, under the old Public Corporation Law, rate regulation took the form of limitation on dividends paid on common stock of public utilities.

Whatever the merit of these systems, the undisputed fact is that they have not lasted. They did not succeed. Utility enterprise has disappeared in Great Britain and is gradually being taken over by government expropriation of foreign investment in South American countries.

Here in the United States, commission regulation of utilities is stronger, more entrenched than ever. Why is that? Isn't it because it has always managed, through the years, to get around obstacles and economic difficulties by a process of adjustment?

Formula Not the Answer

If I had to sum up all the condensed wisdom of the United States Supreme Court decisions on the subject of utility rate regulation for the past 75 years, ever since *Munn v. Illinois* in 1877 and right down through the Hope Case in 1944, I would say that the court has been trying to tell us just this:

"Put not your faith in formula."

Now that advice is pretty hard to take at times. There is a stubborn streak in the best of us which naturally gravitates towards a formula, a set plan or pattern, which will always give us the right answer.

But our highest court has persistently refused, in case after case, to concede that there exists any single approach which has so fulfilled the requirements of equity and reasonableness, and the other ingredients of effective rate regulation, as to be entitled to a conclusive presumption at all times and under all circumstances.

In this connection, we have the classic controversy over the formula of strict adherence to the original cost rate base, less depreciation, for ratemaking. In my own writings I may have given some of my readers the impression that I am opposed to this doctrine in itself, which is not so.

What I have been trying to do, and I may have unconsciously bent over backwards trying to develop my point, is to make clear that a formula which will work all right in one situation, may not necessarily work all right in another.

In other words, regulation must not be captured and imprisoned in any strait jacket or it will go the way of European and South American regulation, which cracked under pressure of changing economic and political conditions because it could not adjust.

Hence the suggestions which I have presumed to make as editor, as well as a reporter, with respect to the way recent court decisions have been trending—that "no formula is good formula."

This does not mean that formulas are not useful or trustworthy under qualified circumstances as to their reasonable application. To distrust all formulas would be to go to the other extreme and impose a terrific burden of responsibility on the regulatory commissions for each and every rate case.

The golden mean would seem to suggest that formulas are useful tools for those who know how to apply them, and supervise their effective operation.

Opportunity Present in Change

What I have said here about rate regulation is applicable to public utilities' position on legislation as it might affect them at the congressional level or in the state capital. Changing conditions always create opportunities.

Let me give you an example. Back in the late twenties, the federal government wanted to sell the Wilson dam properties at Muscle Shoals, Ala. The Ford Motor Co. was interested. A chemical company was interested. Some power companies were interested. At one time 5 million dollars could have taken it off the market. But while these parties were sharpening their pencils, TVA was launched.

Compare that with what happened when the gas utilities were faced with a similar situation after World War II when the government disposed of the Little Inch and Big Inch pipelines. The gas companies bought the gas lines.

Part of the price we must pay for the very public understanding which I emphasized in my first point, is to be alert to the opportunity to make concessions where concessions are due in the over-all public interest.

No telephone subscriber is going to be mad at his telephone company for trying to get his excise tax reduced or repealed. But if it comes down to a question of raising necessary revenue for federal government obligations, the industry's cue, it seems to me, is to make its case first on behalf of the subscriber to the Congress, and if that fails to make the case on behalf of the government to the subscriber.

The telephone industry has an opportunity to demonstrate its resourcefulness in coping with such a passing problem in its relations to the Rural Electrification Administration's program. Potentially, the 1949 act of Congress putting REA into the rural tele-

phone loan business could become the thin edge of the wedge of a federal invasion of the telephone business, such as has given the electric power utilities much difficulty. Actually, cooperation with REA, in getting more and better telephone service on the farms as quickly as possible, could minimize the danger.

This brings up the important question of whether it is always wise for business to try to protect itself by seeking an affirmative act of Congress in order to change some policy. Sometimes that legislative approach is the only way, because administrative policy or court decision, or both, have left no alternative. We have an example of that in the recent success of the USITA in getting a law through Congress to exempt small companies using radio from full jurisdiction of the FCC.

But there are other situations in which such problems can be solved by administrative interpretation, if the spirit is willing on both sides. By both sides I mean an administrative department of the government which wants to get things done and business people willing to cooperate, even to the point of waiving some strictly legal right or company prerogative.

Laws Not Irrevocable

If I might digress here, I would like to comment upon the tendency in some quarters to put considerable faith and stress on legislation and litigation. With all due respect and recognition of the need for both, may I suggest to you that there never was a law passed by one Congress that could not be repealed or amended by another law. There never was a court decision that could not some day be overruled by another court decision. I saw this mistake (of placing too much reliance on both) made years ago by segments of the electric industry and I see some signs of history repeating itself, to some extent, today in the gas industry.

This idea that an industry's regulatory responsibility can be avoided by getting a phrase or clause inserted into a law or by taking the matter to court with high-priced lawyers has not always panned out. For 30 years, I saw the electric utilities retreat from one position after another, trying to avoid regulatory commission jurisdiction under the Federal Power Act and the Holding Company Act.

The end result, over the long range, was the most strict regulatory laws on the books today. I often wonder how it might have worked out if this great industry had tried to live with commission regulation and arrived at an understanding with it from the very beginning.

Recently in Washington I heard the argument in the U. S. Supreme Court in the controversial Phillips Petroleum Co. Case, which involves FPC jurisdiction over gas production. I am not going to stick my neck out and forecast what the highest court will decide in that case, because there the FPC itself is trying to get out of taking over jurisdiction. I only know that, over a long-enough period, every industrial fight against the jurisdiction of the regulatory commissions has failed.

Rural Situation Vulnerable

Getting back to the REA: As a matter of fact, the rural telephone situation is a lot more vulnerable today to encroachment by cooperatives, and even public agencies, than the rural electrification situation has been in many years. More than half of our farms—according to the definition of a farm as used by the U. S. Census Bureau and the REA—on a national average, still do not have telephone service as compared with over 90 per cent of the farms which now have electric service.

On the other hand, the telephone industry has a better REA statute to work with than the electric companies ever had. REA, under its telephone law, has to deal first—and by preference—with the existing telephone company in making loans and to avoid service area duplication if it can.

It worked out just the other way with the REA electric loan policy, under which over 1,000 REA co-ops were born in the 19 years between 1935 and 1953.

But consider this: Today, after only four actual years of active telephone loan operations, there are 241 REA telephone borrowers, 131 co-ops and 110 commercial companies.

So you see telephone co-ops have had a proportionally larger birth rate, considering the time span, than the electric co-ops. These co-ops have borrowed approximately 106 million dollars; commercial companies have borrowed much less than half that amount—about 48 million dollars.

It must be recognized, and I am sure that it is on the part of responsible company management, that these REA cooperatives could easily become a permanent part of our telephone industry landscape, unless this rural service problem is licked to within at least an approachable margin between supply and demand within the next four or five years.

Already the REA electric cooperatives are talking about expanding with private financing, knowing that in the utility business they must grow or die, and realizing that the federal REA loans may some day dry up or become insufficient.

Of course, these earlier REA cooperatives got such a big start during a period of aggressive federal paternalism—which does not exist today. If the strong supporting hand of the government were permanently withdrawn, they would tend to shrivel up and fade away in competition with private companies, by consolidation, merger, sale, or similar developments. That has always been the normal tendency of cooperatives in this country before the federal government (by tax exemption and by other subsidies) began to prop them up.

There used to be about 40,000 little local mutual type cooperatives in the telephone picture around the beginning of the century. They have virtually disappeared. But the co-op we have to deal with today is a different and much stronger proposition.

A Weakness In the Co-op

There is one weakness of the modern co-op, which is always a fair target. That is this very factor of subsidy support. We heard a lot of pious political palaver about them paying their own way and not costing the taxpayers a cent; but that is sheer eyewash.

Who pays federal REA's wages?

Who pays for its engineers and other professional services?

Who pays for its office buildings and other operating expenses?

Who pays the difference between that subnormal interest rate of 2 per cent and what it cost the government to borrow money for such loans?

Who pays to offset lost taxes which would be paid *into* the Treasury if commercial companies were operating in these service areas?

You know who pays—it is the general taxpayer, including the utility companies. These are all points which need to be hammered on continually. But it will all be to no avail unless the central problem of rural service is taken care of before another kind of administration goes to Washington, with new plans to grow just as many cooperatives in the telephone field as were raised in the electric field and maybe that could happen.

As long as the cooperatives continue to exist and to grow, you have a focal point of public ownership infection—not serious now—but which, under other political influence, could flare up and do real damage to the investor-owned telephone industry as a whole.

It would be presumptuous for me, as an outsider, to try to suggest any main course to follow; and there are a number, such as more aggressive private financing; consolidation of small and

(Please turn to page 71)

THE PLANT MAN'S Notebook

by Ray Blain, Technical Editor

THE RAPID increase in the number of stations of many Independent telephone companies and the expansion of extended area dialing during the past few years, have caused many of these companies to discontinue the use of rotary information files and make use of printed directories brought up to date at frequent intervals.

The modern information desk is a two-sided affair, with a row of operators along each side. Information lines terminate on turrets located in the middle of the switchboard and between the operators.

Directory racks are also located in the center so that they can be conveniently reached by operators from both sides. The positions are separated by clear plastic partitions to reduce interference between adjacent positions.

Good information service, while always a problem, is more important today than ever before in order to speed up the traffic and reduce circuit time loss to a minimum. It is believed that this new information desk is a good start toward solving this long-standing problem.

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It has been said that most cities spend for police and correction work more than 10 times what they do on recreation.

• • •

Telephone operating men often wonder what effect atomic bombing might have on communication facilities in a community.

Some indication as to the possible extent of this damage might be gained from the film "Operation Ivy" which is a documentation of the operations of Task Force Number 132 which conducted a thermonuclear experiment at Eniwetok in November, 1952.

The "burst" resulting from the test completely obliterated the test island in the Eniwetok Atoll. It tore a cavity in the floor of the ocean—a crater—measuring a full mile in diameter and 175 feet in depth at its lowest point.

It has been estimated that such a burst in a metropolitan area would cause absolute destruction over an area 6 miles in diameter. The area of severe-to-moderate damage would extend 7 miles in all directions from ground zero.

Finally, the area of light damage would reach 10 miles from the point of detonation. In other words, an area covering approximately 300 square miles would be blanketed by this hydrogen explosion.

This experimental burst may be followed soon by one with perhaps twice its explosive power according to recent press reports on the operation of Joint Task Force Seven in the Marshall Islands.

The film "Operation Ivy" should prove of interest particularly to industrial mobilization planners in terms of the implications of damage to the industrial mobilization base, including productive capacity and manpower.

Press releases have stated that the Russians have conducted a thermonuclear test and have the capacity of bombing metropolitan areas of the United States. In this connection, it is noted that the Office of Defense Mobilization has reported that 50 selected metropolitan areas of the nation contain 71 per cent of its industrial capacity and employ 54 per cent of the people engaged in manufacturing.

Further a committee from the Office of Defense Mobilization stated:

"Many varying estimates have been made as to the probable manpower losses resulting from ensuing attack on the United States. Almost all of these estimates run into several million casualties, with varying proportions of killed and injured.

"It seems clear that an enemy attack would effect a very serious and direct reduction in our manpower potential. . . .

"Moreover, the destruction of industrial plants, community facilities, and disruption of such vital services as transportation and communication might reduce the effective utilization of manpower very substantially."

• • •

A new flexible tubing called "Flexaust" is now available and should prove desirable for use in connection with portable blowers for the ventilation of manholes. It also should prove desirable for use with portable heaters for the ventilating and heating of manholes in winter.

These tubes are furnished in sizes from 1¼-inch to 12-inch i.d. Larger sizes, from 12-inch to 28-inch i.d., may be obtained on special order.

To give longer life, greater strength and a higher resistance to flexing fatigue as well as improved appearance to this device an improved method of construction is used.

The high quality fabrics are precoated on both sides with a well-balanced neoprene compound. This coating is specially formulated to give maximum resistance to moisture, acids, aging and abrasion.

Steel wire reinforcement—tensile strength 90,000 to 120,000 p.s.i.—is permanently imbedded in the fabric. This reinforcement is in the form of a coil spring so that the hose may be collapsed into a small space when not in use.

In the completed hose, the wire is protected from external abrasion by three plies of coated fabric, and from internal abrasion by one ply of coated fabric.

The hose is not stitched and does not unravel; it has a minimum wall thickness of two plies of coated fabric, or six layers of material.

The 10-inch size has a weight of 2.2 pounds per foot.

• • •

It has been said that your safety is never an accident. It is better to take a precaution instead of a chance.

Maintenance Testing Equipment

By JOHN A. BRACKEN

PART 71. The preceding article in this series appeared in the April 3 issue, page 20.

WHEN MEASURING power in telephone equipment direct current circuits, it is found that the power expended in watts, is the product of the electromotive force (EMF) and the current, or W=EI.

In alternating current (ac) circuits encountered in practice, the situation is different, due to a distinction being made between the true power and apparent power. It is necessary to take into consideration the presence of resistance, and such influencing forces as inductance and capacitance. The power consumed in a circuit containing inductance, capacitance, or both, is seldom equal to the product of the EMF and current, unless the circuit is in a condition called "resonance."

By resonance is meant that circuit condition existing when the value "X_L" of the inductance inserted in the circuit equals the value "X_c" of the capacitance in the same circuit; their effect thus is neutralized or annulled, and the total reactance is zero.

In other words, the inductive and capacitive reactances balance one another, resulting in the circuit impedance being reduced to plain ohmic resistance, and the power in the circuit is simply W=EI, as in direct current circuits. [Note: See "Maintenance Testing Equipment," Part 59 (TELEPHONY, Apr. 11, 1953, page 35, Chart 1), for meaning of symbols "X_L" and "X_c".]

Example: A simple resonant 60 cycle circuit is shown in *Fig. 1*, where "G" represents an ac generator, "C" a 2 mf capacitor, "L" an inductance of 3.52 henrys, and "R" a 600-ohm resistor. What would the power be in this circuit?

Solution: The reactance of the capacitor "C" is $X_c = 1 \div (\omega C)$. (1) $\omega C = 6.283 \times 60 \times .000002 = 0.000754$.

(2) $X_c = 1 \div .000754 = 1{,}327$ ohms.

(3) The reactance of the inductance "L" (relay) is $X_L = \omega L = 6.283 \times 60 \times 3.52 = 1{,}327$ ohms.

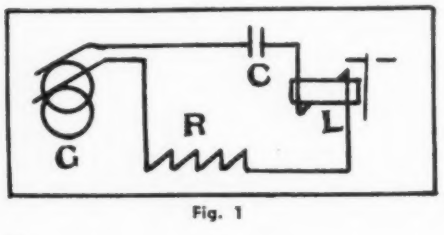


Fig. 1

(4) $Z = \sqrt{R^2 + (X_L - X_c)^2} = \sqrt{600^2 + (1{,}327 - 1{,}327)^2}$. $600 \times 600 = 360{,}000$, and $(1327 - 1327) = 0$; that is, the two reactances "X_L" and "X_c" cancel each other out, and the net reactance is zero.

(5) Then $Z = \sqrt{360{,}000} = 600$ ohms, simply equaling the value of "R", in *Fig. 1*, and demonstrating that there is no resistance in the circuit other than the 600-ohm resistance "R."

When ac is applied to a circuit in resonance, the current and EMF are said to be in phase. The term "phase" as applied to electrical work has several distinct meanings. One meaning is associated with such ac circuits as single-phase, two-phase, three-phase, etc.

Again, the term phase is related to a period of time. For example, assume two identical alternating current generators designated "A" and "B." Generator "A" is started up and produces an EMF which changes as shown in the "A" curve, *Fig. 2*.

If generator "B" is started 1/240 of a second after generator "A" is started, EMF's as shown in the curve "B," *Fig. 2*, will be produced. It is apparent that

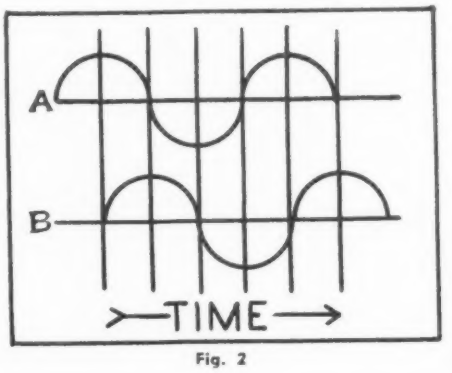


Fig. 2

although each generator produces an EMF which has the same range of values, the same EMF will not be produced by both generators at the same time.

In fact, generator "B" will always produce an EMF corresponding to the EMF of generator "A" at any particular instance exactly 1/240 second later. Therefore, the two EMF's are said to be one-quarter period out of phase. The vertical lines designate time in *Fig. 2*, and represent 1/240 second each.

In telephone equipment ac circuits where the resistance, inductance, and capacitance are not in resonance, the current does not keep in phase with the EMF.

When inductance is involved, the current is said to lag behind the EMF and is out of phase. Similarly, if there is capacitance in the circuit, the current will lead the EMF, but it also is out of phase.

This leading and lagging of the current is measured as an angle, called the angle of lead or lag, and expressed in electrical degrees based on the custom of considering an ac cycle being analogous to a circle divided into 360 imaginary degrees. Degrees are indicated as shown in *Fig. 3* where the six vertical lines from left to right represent 0, 90, 180, 270 and 360 degrees respectively.

In this way, it is found convenient to express the leading and lagging of ac and reactive EMF in electrical degrees of a circle instead of in parts of a cycle.

It should be understood that there are several distinct counter EMF's acting in an ac circuit containing inductive reactance. In order to overcome this so that current may pass, a component of the applied EMF is used, the force necessary being equal and in direct opposition to the counter EMF of the circuit self-induction.

Another component is required to overcome the resistance of the circuit, but this one must be in phase with the

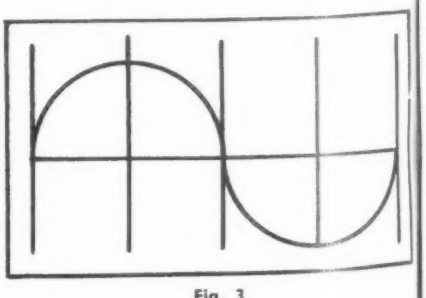


Fig. 3

current or in the same direction. Components are considered as forces acting in ac circuits.

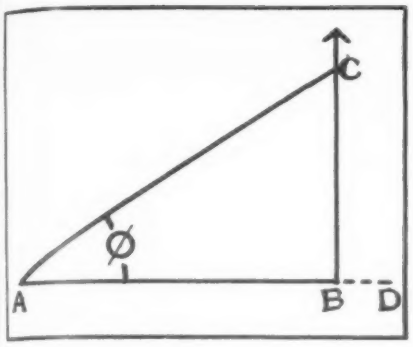


Fig. 4

Example: *Fig. 4* shows a right triangle representing the relations between the applied EMF indicated by the line "AC" and its components which are represented by lines "AB" and "BC." Component "AB" is the one which overcomes the resistance of the circuit and is in phase with the current, while the "BC" component overcomes the counter EMF of self-induction and is at right angles to the current.

The component "AB" is equal to the product of multiplying the current by the resistance; and the component "BC" is equal to the current multiplied by the reactance. The result gives the voltage drop.

The applied EMF of the circuit may be obtained by the formula: EMF = $\sqrt{E_R^2 + E_X^2}$, where "E_R" represents the EMF drop in the resistance, or line "AB"; and "E_X" the EMF drop in the reactance, or line "BC."

Example: Suppose the drop across the resistor "R" shown in *Fig. 5*, is 42

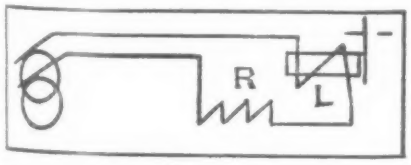


Fig. 5

volts and the reactive drop across the inductance "L" is 80 volts. What is the applied EMF?

Solution: EMF = $\sqrt{E_R^2 + E_X^2}$ = $\sqrt{42^2 + 80^2}$ = 90 volts.

In *Fig. 4* the reactive EMF lags behind the current by one-quarter of a cycle which is expressed as a lag of 90°. It is also shown that the current, which is in the direction of "AD," lags behind the applied EMF in the direction "AC" by an angle of a certain number of degrees, designated by the tangent sign "Ø," and known as the angle of lag of current in the circuit. The larger the reactance is, compared to the resistance, the larger will be the angle of lag.

Again, if the reactance is small in comparison with the resistance, the angle of lag will be small, and the current will be nearly in phase with the applied EMF.

TABLE 1

1	2	3	4	5	6
ANGLE	COSINES	TANGENTS	ANGLE	COSINES	TANGENTS
0	1.000	.000			
1	.999	.018	46	.695	1.04
2	.999	.035	47	.682	1.07
3	.999	.052	48	.669	1.11
4	.998	.070	49	.656	1.15
5	.996	.088	50	.643	1.19
6	.995	.105	51	.629	1.23
7	.993	.123	52	.616	1.28
8	.990	.141	53	.602	1.33
9	.988	.158	54	.588	1.38
10	.985	.176	55	.574	1.43
11	.982	.194	56	.559	1.48
12	.978	.213	57	.545	1.54
13	.974	.231	58	.530	1.60
14	.970	.249	59	.515	1.66
15	.966	.268	60	.500	1.73
16	.961	.287	61	.485	1.80
17	.956	.306	62	.470	1.88
18	.951	.325	63	.454	1.96
19	.946	.344	64	.438	2.05
20	.939	.364	65	.423	2.14
21	.934	.384	66	.407	2.25
22	.927	.404	67	.391	2.36
23	.921	.425	68	.375	2.48
24	.914	.445	69	.358	2.61
25	.906	.466	70	.342	2.75
26	.899	.488	71	.326	2.90
27	.891	.510	72	.309	3.08
28	.883	.532	73	.292	3.27
29	.875	.554	74	.276	3.49
30	.866	.577	75	.259	3.73
31	.857	.601	76	.242	4.01
32	.848	.625	77	.225	4.33
33	.839	.649	78	.208	4.70
34	.829	.675	79	.191	5.14
35	.819	.700	80	.174	5.67
36	.809	.727	81	.156	6.31
37	.799	.754	82	.139	7.12
38	.788	.781	83	.122	8.14
39	.777	.810	84	.105	9.51
40	.766	.839	85	.087	11.43
41	.755	.869	86	.070	14.30
42	.743	.900	87	.052	19.08
43	.731	.933	88	.035	28.64
44	.719	.966	89	.017	57.29
45	.707	1.000	90	.000	Infinity

The tangent Ø of the angle is equal to the reactance divided by the resistance. In circuits where both the resistance and reactance are known, the angle of lag may be found by the formula: Tan Ø = X ÷ R.

Example A: If the reactance of a circuit is 867 ohms and the resistance 500 ohms, by what angle will the current lag behind the EMF?

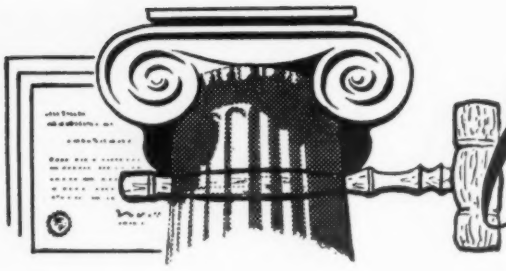
Solution: (1) Tan Ø = X ÷ R = 867 ÷ 500 = 1.73, which is the tangent of the angle.

(2) To find the angle corresponding to this tangent, refer to *Table 1*, column 6, and under the heading "Tangents," follow down to 1.73; then across to the left, to column 4, where, under the heading "Angle," will be found the number 60, indicating 60°, the angle which represents the lag of the current.

The power expended in the circuit at any given instant is the same, but the average power may be much less than the volt-amperes, because the current and voltage are not necessarily in phase, and it is only the component of the current that is in phase with the EMF that produces the power.

When the EMF and current differ in phase, the true power may be found

(Please turn to page 33)



Courts and Commissions

Florida Company Granted $160,015 Rate Raise

The Florida Railroad & Public Utilities Commission on Apr. 29 authorized the Florida Telephone Corp., Ocala, to increase its rates, effective May 1, in an amount sufficient to produce $160,015 additional gross revenues (TELEPHONY, Mar. 6, p. 24).

On Sept. 1, 1953, the commission denied the Florida Telephone Corp. application to increase its general rates. The commission at that time found the company was entitled to earn a return of 7.13 per cent on a base rate of $5,479,415 and that in order to produce such a return, the company's general exchange revenue would have to be increased by the gross amount of $160,015 or about 18 per cent.

The commission further found, however, that the service being rendered by the company did not justify rates and charges which would produce the return which the commission found would be fair and reasonable. Therefore, the application was denied because of poor service.

The company was dissatisfied with the commission's order and appealed to the Supreme Court of Florida for review of the commission's order.

The supreme court decided the commission had no authority to deny an increase in rates because of poor or inadequate service, but must treat service complaints and rate applications separately.

The commission noted that in the meantime, the Florida Telephone Corp. divested itself of several of its smaller and non-profitable exchanges (TELEPHONY, Apr. 24, p. 57). It was not determined what effect the sale of these non-profitable exchanges would have upon the company's earnings.

The Florida Telephone Corp. submitted to the commission a schedule of proposed rates and charges which would produce the additional gross revenues found to be reasonable by the commission and which the Supreme Court of Florida said must be allowed regardless of the poor service being rendered by the company.

The Florida Telephone Corp. was therefore authorized by the commission to increase its rates and charges, effective May 1, in an amount sufficient to produce $160,015 additional gross revenues.

V V

Illinois Company Proposes New Rate Schedule

The Millstadt Telephone Co. filed a petition with the Illinois Commerce Commission the last week of April, asking for a new rate schedule.

The proposed rates are as follows:

	Old	*New*
One-party residence	$3.00	$4.00
Two-party residence	2.50	3.00
Four-party residence	2.25	2.50
One-party business	4.50	6.00
Two-party business	4.00	5.00
Rural multi-party residence	2.50	3.00
Rural business	3.00	4.00

V V

Illinois Companies Ask Purchase, Note Approval

The Illinois Commerce Commission was to have held a May 4 hearing on the application of the Champaign County Telephone Co. for authority to purchase the property of the Sadorus Telephone Exchange, and for the issuance of a certificate to operate the Sadorus company's facilities.

The commission also was to have held a May 4 hearing on the application of the Casey, Toledo & Neoga Telephone Co., Casey, for authority to issue $1,320,000 of its promissory notes which would be secured by a first mortgage on its properties.

V V

New Dial Exchange Approved For North Carolina Company

The Albemarle Telephone Co. on Apr. 26 was authorized by the North Carolina Utilities Commission to install an unattended dial exchange at New London and to set new rates for New London telephone users (TELEPHONY, Apr. 17, p. 25).

The exchange will serve Meisenheimer and Richfield as well as New London, and will have toll-free connections with Albemarle, the exchange through which New London formerly was served.

When the new exchange, which will cost an estimated $60,000 is put into operation, New London's business rates would be $7.50 for one-party service, $6.75 for two-party, $6.00 for four-party, and $5.25 for rural multi-party service.

Residence rates would be $4.00 for one-party service, $3.50 for two-party, $3.25 for four-party and $3.50 for rural multi-party.

In addition, subscribers outside the base rate area will be charged a mileage fee.

V V

Minnesota Independent Buys Five Companies

Purchase of five companies by the West Central Telephone Association, Wadena, was approved on Apr. 19 by the Minnesota Railroad & Warehouse Commission. The five companies are:

Blowers-Homestead Telephone Co.
Blowers Rural Telephone Association
Hay Creek Telephone Cooperative
Line No. 5 Telephone Co.
Paddock Telephone Co.

V V

N. C. Companies Ask Higher Connection, Paystation Rates

Thirty-two Independent telephone companies operating in North Carolina on Apr. 27 asked the North Carolina Utilities Commission to approve new and higher connection charges and to authorize an optional 10-cent toll call on local calls from paystations.

The petitions were presented by members of the North Carolina Independent Telephone Association through J. F. Haven of Tarboro, president of the association, and vice president of the Carolina Telephone & Telegraph Co.

Mr. Havens said the changes in service charges are needed to bring them into line with increased costs. He pointed out that while telephone rates have been increased generally in the past several years, service charges, in many cases, have remained the same.

It was explained that the optional increase on local calls from paystations was requested because some small

(Please turn to page 30)

From every city and town where Strowger Automatic is used comes the same convincing story: time proves that nothing can equal it for dependability! Here's one of our hundreds of satisfied customers—High Point, North Carolina.

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High Point, and hundreds of successful exchanges like it, are your guarantee that Strowger Automatic is your safest investment.

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companies might lose business if they were required to raise the toll from the present five cents.

A charge of $6.50 for installing a main station telephone, a charge of $7.50 for installing a telephone outlet, and a flat $3.00 charge for other connections were asked by the companies. The proposed charges are about double those now in effect.

A few companies already have a schedule of service connection charges equal to those requested, as well as the 10-cent local call, and it was stated that the action requested by the companies would "equalize" the service charges currently effective.

V V

Four Wisconsin Companies Ask Rate Relief

The Wisconsin Public Service Commission has scheduled May 3 hearings on the following companies' applications for rate increases: The Central State Telephone Co., Junction City; the Jim Falls Telephone Co., and the Eagle Point Telephone Co.

The commission also has scheduled a May 7 hearing on the application of the Wayside Telephone Co. for authority to increase rates.

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We hope you will read our complete story in a few weeks.

Four Kansas Companies Granted Rate Raises

Four Kansas companies on Apr. 26 were granted rate increases, effective May 1, by the Kansas Corporation Commission, as follows:

Longton Telephone Co. was allowed a $4,437 increase. The company, which serves 321 subscribers, had asked $5,172.

Home Telephone Co., Randolph, with 504 subscribers, was permitted to raise rates by $2,634. It had requested $2,877.

Green Telephone Co., which serves 254 subscribers, was authorized a $1,586 increase after asking for $1,602.

Home Telephone Co., Scottsville, serving 116 subscribers, was allowed an annual increase of $1,200.

V V

Missouri Companies Ask O.K. Of Stock, Mortgage Issues

The Missouri Public Service Commission on Apr. 28 received the application of the Friedheim Telephone Co. for authority to issue 500 shares of its common stock without nominal or par value. The company also asked the commission for a certificate of public convenience and necessity.

The commission received, also on Apr. 28, the application of the Oregon Farmers Mutual Telephone Co. for authority to issue its chattel mortgage to Stromberg-Carlson Co. of Rochester, N. Y.

V V

Company in Nebraska Seeks 25% Increase in Rates

The Farmers Independent Telephone Co., Red Cloud, filed an application with the Nebraska Railway Commission on Apr. 21 for a 25 per cent increase in telephone rates.

The application states that additional revenue is needed to pay increased plant wages of $1,200 annually and commercial wages of $600 a year.

The company also listed plant improvements which had added considerably to its investment.

V V

Oregon Incorporation, Loan Authorized

Oregon Public Utilities Commissioner Charles Heltzel, on Apr. 28 approved the application of Thomas Jackson, doing business as the Home Telephone Co., to transfer the assets of his telephone plant to Home Telephone Co., a corporation, in exchange for 260 shares of its common capital stock of the par value of $100 a share.

The Home Telephone corporation was authorized to borrow from Stromberg-Carlson Co. of Rochester, N. Y., an amount not to exceed $45,000; and as security for this loan, to mortgage its property.

V V

Oregon Rate Plea Made

Oregon Public Utilities Commissioner Charles H. Teltzel has scheduled a June 8 hearing on the application of the Yoncalla Telephone Co. for authority to increase its rates.

V V

Seeks Approval of Note Issue

The New York Public Service Commission was to have held a May 6 hearing on the petition of the Red Hook Telephone Co. for authority to issue and sell its unsecured promissory note in the principal amount of $290,000.

V V

1953 Reported as Year of Highest Auto Death Toll

The Travelers Insurance Cos., Hartford, Conn., have just released the 20th edition of their highway safety book entitled "The Passing Scene."

According to statistics contained therein, 1953 recorded the greatest automobile accident toll in the nation's history—more than two million casualties.

The booklet shows that excessive speed was the most dangerous driving mistake last year. Speed killed 13,870 persons and injured more than 600,000. Drivers under 25 years of age were involved in almost 25 per cent of the year's fatal accidents although they constitute only about 15 per cent of the total of all drivers.

Weekend crashes accounted for 15,800 killed and 800,000 hurt during 1953. Forty-one per cent of the deaths and 36 per cent of the injuries occurred on Saturdays and Sundays last year.

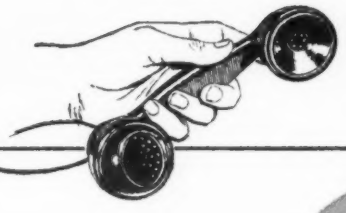
The pedestrian record reflected the third consecutive year of improvement. Booklet figures show pedestrian casualties reduced by 50 to 8,600. Crossing between intersections, "jay walking," still is the chief cause of pedestrian deaths and injuries.

"The Passing Scene" also reports that three out of four 1953 auto accidents happened to passenger cars driving in clear weather on dry roads.

Eighty per cent of vehicles involved in fatal accidents were traveling straight ahead, and Saturday was the most dangerous day of the week to drive.

1953 was the fourth consecutive year of increase in the death toll.

GraybaR

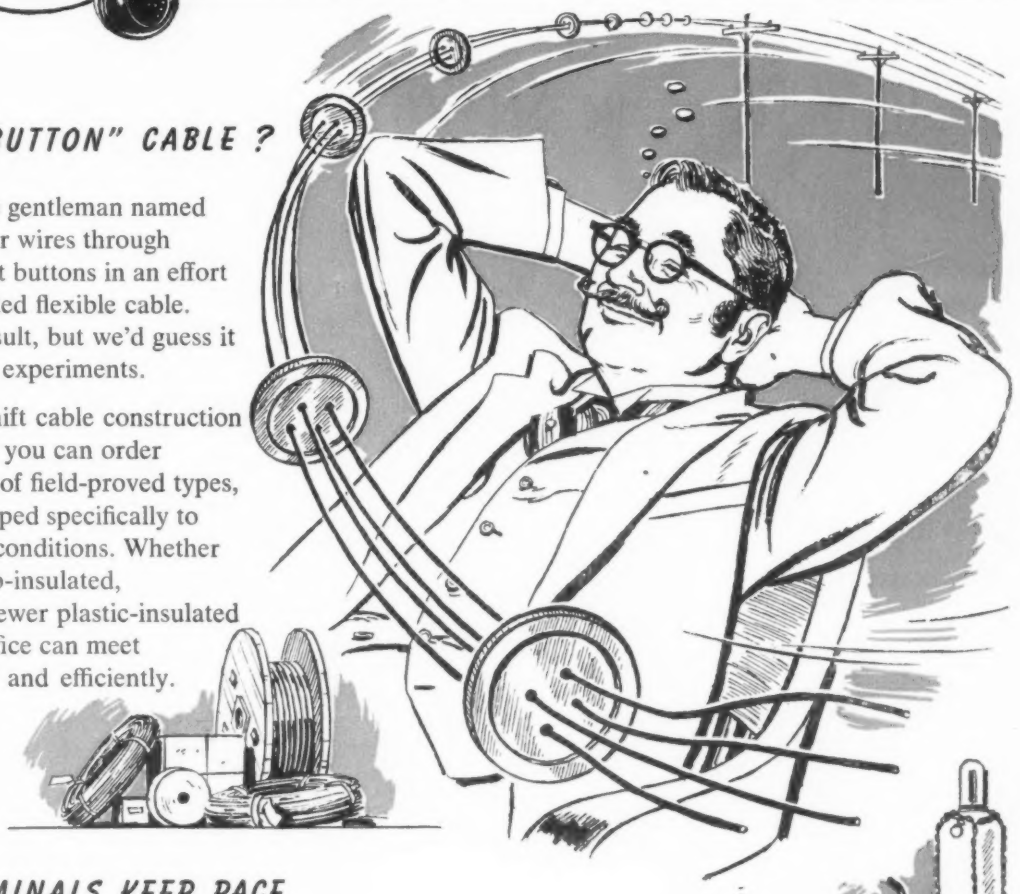


TELEPHONE NEWS

EVER HEAR ABOUT DELANEY'S "SHIRT BUTTON" CABLE ?

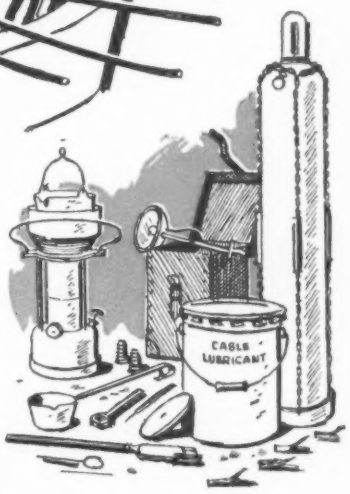
Yes, in the '80's, an inventive gentleman named Delaney threaded bare copper wires through the holes in thousands of shirt buttons in an effort to produce a practical insulated flexible cable. History doesn't tell us the result, but we'd guess it was no worse than most first experiments.

Today, of course, make-shift cable construction is a thing of the past. In fact, you can order from Graybar a wide variety of field-proved types, all of which have been developed specifically to meet the needs of particular conditions. Whether you prefer conventional pulp-insulated, lead-jacketed cables or the newer plastic-insulated types, your local Graybar Office can meet your requirements promptly and efficiently.



TERMINALS KEEP PACE

Reliable type RU terminals are also available with a plastic stub for use with plastic-insulated cables. Completely weatherproof, this terminal can be installed either stub up or stub down. It is available in 6-, 11-, and 26-pair models.



OFF LIMITS FOR LINEMEN

Checking insulation on the lines was a thankless, heartbreaking job in the early days of the telephone industry. A long handled brush and a bucket of pitch was the principal equipment. And after plastering insulators and splices on miles of line, the lineman was such a mess that he was barred from almost every tavern.

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By WELDON W. CASE

W. W. CASE

THE PROBLEM of how best to lend aid and assistance to the so-called small Independent telephone company in our state and in our nation has long been one of the problems of both the national (United States Independent Telephone Association) and the state telephone associations.

Through the years many telephone men have actively given of their time and resources in order to solve some of the problems confronting the operation of a small telephone company. With few exceptions, this had been on a voluntary basis and almost without exception the advice and services rendered by these men were in an advisory capacity. Very often, even though excellent plans had been made, the result was that either the plans were not followed, or if followed, they were not carried through to a successful conclusion.

The results of many studies involving the Independent industry have pointed up certain basic facts relating to our industry, as to the minimum size that a company should be in order to perform the necessary services for its customers and to maintain adequate personnel for the assurance of good telephone service.

It has been generally agreed that the minimum size of a telephone company should be somewhere between 500 and 1,000 telephones, depending on local situations. As you know, many of our companies in Ohio are of a size which is considerably less than the 500-station figure.

Accordingly, a program of helpful consolidation was entered into by the Ohio Independent Telephone Association under the auspices of its Small Company Committee. Since 1946, the number of companies in Ohio has been reduced from 225 to approximately 175.

***EDITOR'S NOTE:** Inasmuch as the small company assistance program of the Ohio Independent Telephone Association introduces a new approach in this work, the report of the Telephone Service Committee of Ohio, given at the recent Ohio convention by Chairman Weldon W. Case of Hudson, O., is reproduced herewith in full.*

This, we believe is progress in this particular problem.

However, there are certain problems, in fact a great many problems, which are not wholly solved merely by consolidation nor by becoming a larger operating unit. In the Fall of 1952 when certain representations were being prepared and certain bills were being presented before the Ohio Legislature, it became evident that the people of Ohio were searching for some concrete answer to the problem of improving telephone service in our state. They sought to do this by legislation. As we of the industry know, good telephone service cannot be legislated, but can only come about through good and sound management, operating under laws and regulations which will enable the consumer, the investor and the company to receive that to which each is entitled.

As a result of the feeling then existing in some legislative circles and at the suggestion of a member of the Ohio Public Utilities Commission, the Telephone Service Committee of Ohio was formed consisting of not only telephone men, but also men representing all industries and professions which might have a bearing on the problems. The industries and professions represented on this committee include the investment banks, the commercial banks, The Ohio Bell Telephone Co., the Ohio Farm Bureau Federation, the Ohio commission, one member representing all other utilities—gas, electricity and transportation—plus four representatives of the Independent telephone industry.

We are fortunate in having as members of this committee men who are leaders in their representative fields and men whose advice and knowledge of their particular subjects has proven to be invaluable in solving some of the problems.

The purpose of this committee is to investigate, consider and recommend action in connection with matters relating to the promotion and strengthening of telephone service in Ohio. To this end, the Telephone Service Committee of Ohio has dedicated itself.

Since its inception, the committee has taken under advisement a number of problems presented before it. The first case to be presented was one dealing with a telephone company located in Guernsey County, where the existing company was physically unable and no longer desired to render telephone service. Investigations were made and the area served by this company was divided and served by three contiguous companies.

The next case was the case of a company in southeastern Ohio which had heretofore been unable to arrange for financing to improve and expand its facilities. Through the assistance of the facilities available to the committee, a commercial survey, a plant survey and necessary engineering were provided and the resulting pro-forma balance sheet and income statement were sufficient to arrange for adequate financing for this company to carry on its projects.

You may be interested to know that recently, the first common battery board was cut into service in one of the exchanges of this company, thereby bringing a marked service improvement to the people in that area.

The committee has taken under advisement other problems throughout our state and has in each case been able to suggest a working solution to the problems.

The committee's current problem for consideration is one involving several small telephone companies in northwestern Ohio. It is the recommendation of the committee that in that area certain of the companies in question consolidate into larger and stronger operating units, thereby being able to attract the necessary financing for their needed improvements and being able to hire competent personnel for the maintenance of good 24-hour telephone service.

The committee itself has no magic formula for the solution of these problems. Solutions are arrived at after careful consideration of the effect on each party or parties concerned.

By having available the resources of the engineering staff of the Ohio Public Utilities Commission, the vast resources for commercial and plant surveys of the Ohio Bell Telephone Co., and the facilities offered by our own Ohio Independent Telephone Association, together with the organization, as represented by the Ohio Farm Bureau Federation, and an understanding of our problem by persons representing the financial houses, both investment and commercial, we feel that a great contribution can be made in helping our Independent industry to help itself.

We have one other very important function in that we can, if necessary, exert friendly pressures in the right direction so that improvements and suggested recommendations can be put into effect. If the operator of a small telephone company is suddenly confronted by his local banker as to the desirability of providing improved and expanded telephone service in his county, or if he is confronted by his local farm bureau representative in a cooperative way, rather than an antagonistic way, certainly the operator of that Independent company is going to be encouraged and hopeful of the future if he feels that he has the cooperation and backing of the local people.

The activities of this group are in no way designed to deflect or supplant the operation of the Small Company Committee of either the national or our state associations. This group merely represents one of the methods which our own Small Company Committees can use and should feel free to use in suggesting to our smaller companies various and sundry methods for improving their facilities. On the contrary, it is a group of men willing to lend their time and services in the solving of some of our industry's problems.

In summing up the activities of the Telephone Service Committee of Ohio, we might say that we are a coordinating agency in that, through cooperation of all Ohio businesses and all Ohio resources, we are attempting to bring about those improvements and those expansions which have heretofore at least seemed to be beyond the reach of a great many of our Independent telephone companies.

It is free enterprise, united and dedicated to do a job in the American way.

MAINTENANCE TESTING

Continued from page 23

by the formula: Cos $\theta = R \div Z$, called the power factor. Cos θ is called the power factor because it is the ratio of the effective power to the apparent power; that is, the decimal factor by which the apparent power must be multiplied to obtain the true power value.

The Cos θ is defined as the cosine of the angle by which the current leads or lags behind the EMF of a circuit.

Example: What will be the power factor in Example A above, which has a resistance "R" of 500 ohms and a reactance "X" of 867 ohms?

Solution: (a) Find the impedance "Z." $Z = \sqrt{R^2 + X^2} = \sqrt{500^2 + 867^2} = 999$ ohms.

(b) Cos $\theta = R \div Z$ or $500 \div 999 = 0.50$. This cosine may be found at point .500 in *Table 1*, column 5, and coincides with the 60° angle in column 4.

Assume the current in Example A to be 0.165 ampere and the EMF 110 volts.

Then (1) the power in apparent watts is $W = EI = 110 \times .165 = 18.2$ watts; and (2) the true power is $W = EI \text{ Cos } \theta = 110 \times 165 \times .50 = 9.1$ watts.

Where the apparent watts and true watts are known, the power factor (P.F.) may be found by the formula: $P.F. = W \div (EI)$.

Example: Assume a circuit containing an inductive reactance is supplied with an alternating EMF of 110 volts, and a current of 0.2 ampere. The product of the EMF and current is $110 \times .2 = 22$, which is the number of "volt-amperes," and is a measure of the apparent power.

Suppose the true power is 17.6 watts. What fraction of the apparent power is this; that is, what is the power factor?

Solution: $P.F. = W \div (EI) = 17.6 \div (110 \times .2) = 0.8$ or 80 per cent. The fraction 0.8 or the percentage 80 per cent is the power factor of this particular circuit.

When the true power, power factor and EMF are known, the current "I" may be found by the formula: $I = W \div (E \times P.F.)$.

(1) $E \times P.F. = 110 \times .8 = 88.$

(2) $I = W \div 88 = 17.6 \div 88 = 0.2$ ampere.

Likewise, the EMF "E" may be found by the formula: $E = W \div (I \times P.F.)$.

(1) $I \times P.F. = .2 \times .8 = .16.$

(2) $E = W \div .16 = 17.6 \div .16 = 110$ volts.

Suppose the inductance of the circuit is 7.04 henrys. Then the frequency of the current is, by formula: $f = 159 \div \sqrt{L} = 159 \div \sqrt{7.04} = 159 \div 2.65 = 60$ cycles.

Where it is necessary to know the "frequency," "power factor" and "phase angle" of ac, the desired information may be obtained by means of such instruments as a frequency meter, power factor meter and phase angle meter respectively.

The simplest way to obtain the value of the power in an ac circuit, is by means of a wattmeter which is so calibrated as to measure automatically the true power directly in watts because the movement of the pointer across the meter scale is proportional to the product of Cos θ EI.

Two coils are contained within the wattmeter, one stationary, known as the current coil, and the other movable, called the voltage coil.

The stationary coil is in series with the power supply circuit, and changes of current in the circuit affect it.

The movable coil has a pointer attached to it and the coil is bridged across the circuit. Changes in the circuit EMF affect this coil so that it tends to turn until it is parallel with the stationary coil, thus causing the pointer to move across the calibrated scale.

Both coils terminate at binding posts located on the outside of the meter case to which the circuit being tested is connected.

In using the wattmeter for power measurements, it should be connected in such a way as to cause as small an error in reading as possible. The remaining error is due to the voltage coil taking some current and power from the circuit.

In order that the meter will not indicate this power in watts in addition to the circuit load, the voltage coil should be connected to the circuit on the incoming side of the current coil as shown in *Fig. 6*.

To avoid over heating or possible

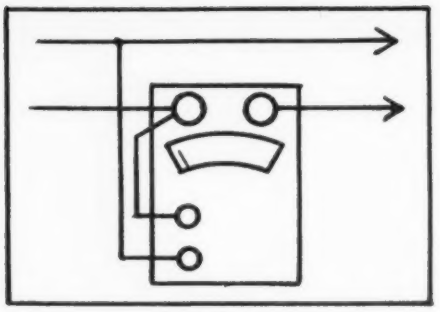


Fig. 6

burn out of the instrument coils, care should be taken to see that the wattmeter is not connected in a circuit carrying either a current or EMF greater than the maximum current and voltage rating of the meter.

(To Be Continued)

Elementary Electricity Quiz

Below are five questions. Underline the word or words in parentheses which you consider the answer to each question.

(1) Ohm's Law (is) (is not) a simple statement which explains the relation of EMF, current, and resistance in a dc circuit?

(2) The voltage between two points in a dc circuit (equals) (does not equal) the current multiplied by the resistance?

(3) An ohm is the unit of (electromotive force) (resistance) (current intensity)?

(4) A volt is a unit of (electromotive force) (current intensity) (resistance)?

(5) An ammeter connected in a circuit indicates the (voltage) (amperes) (ohms)?

See correct answers on page 37.

THE WASHINGTON OUTLOOK

Concluded from page 20

weak operating organizations, and even the use of REA loans by private companies.

It will take an alert telephone industry, both Bell and Independent, to bridge this gap over the next few critical years, during which progress must be made to get more and better telephone service on the farms.

Why Cooperatives?

I think it is important to remember, in this connection, something which REA Administrator Nelsen said at the national cooperative meeting in Miami, last January, when he was asked why cooperatives were born. He said (as I recall) that cooperatives did not, for the most part, come into existence because of high rates of the commercial telephone companies but mainly because farmers have not been able to get service at all.

Now there is another situation, very much in the plastic stage in Washington right now, which is quite likely to command all the resourcefulness of the telephone industry to be sure that a basically fair and just solution prevails. I refer to the regulatory problem, developing before the Federal Communications Commission, on whether to allow public agencies and private noncommunications industry to operate their own intra-system services via microwave, or leased radio relay facilities.

What the FCC decides to do about this within the next year may very well affect the operations of the land-wire telephone companies in this important field for years to come.

Because this is essentially a technical engineering matter, all I can say about it is that the telephone industry is fortunate in having its interests well represented in Washington, and having this basic question come up at a time when the atmosphere within the FCC is one that is not as critical to the common carrier communications business as has been the case in some years gone by.

But it still will require plenty of give and take and alert industrial bargaining to see to it that the public interest is not harmed by the abuse of indiscriminate radio frequency licensing and unnecessary cluttering up of the radio spectrum by private interests. There is an opportunity here for the telephone industry to identify its interests with the public interest.

Now, I am not saying that what is good for the telephone industry is necessarily good for the country. But I do say that to the extent the telephone companies search out, and actively associate and identify, their industrial interest with the demonstrable public interest, to that extent will they prosper.

Future of the Telephone

You do not have to be an engineer or technician to know that we stand today on the threshold of great changes in the traditional land line telephone business.

It took a half-century to get the telephone off the hook in the downstairs hall and spread it all over the house. But within a comparatively few years, it is quite possible that an increasing number of users will have telephones in their cars and trucks, stretching for miles all over their own business properties and systems. They will even be wearing them around their necks.

More and more outside interests are trying to get into the telephone act, including the ever-dangerous state and local government agencies. Obviously, this is a time of great decision for the future of your business, as a business.

That brings up one last thought I would like to leave with you on this general subject to being alert to such opportunities. We are all well aware that we live in critical times, when a cold-blooded science—devoid of moral or ethical considerations—may even be capable of wiping out the human race.

It seems to me, that business leadership must be alert to cast the weight of business on the side of the humanities and spiritual values, which have too often been lost sight of in the past. If the human race is to survive, it must rediscover its soul. I hope I will not be accused of irreverence if I add, modestly, that such a course will also be necessary if business is to survive.

At the present time, at the Washington level at least, the atmosphere for business is better now than for many years. But we cannot depend on this to continue indefinitely.

In fact, business must use this opportunity to strengthen its defenses for the protection of the American people because we know that the enterprise system is in the people's best interest. And, so again, I would like to urge upon you the importance of keeping the positive value of your business constantly in the eyes of the American people and the politicians and anybody else. You cannot afford to be timid or ashamed of it. It is an industry with a record for service of which you can be proud.

In a nutshell, I would suggest an acid test for every major policy proposal the industry stands for. This acid test question is simple:

Does that proposal coincide with the utility's over-all ability to serve the public interest?

If the resulting answer meets that test, our business leadership has no fear of the consequences. Utility management will then, and always, be in a position to speak up articulately, to continue its course alertly, with due regard for adjustment to suit the changing scene.

V V

N. Y. Company Reports Paystation Increase

It was recently reported that the paystation rates of the Delaware Telephone Co., Walton, N. Y., were to be increased from five to 10 cents.

The company reportedly is spending $480,000 for improvements this year.

V V

An honest man is seldom a vagrant.
—Cato.

REA Approves $1,649,000 for Six Loans

Six more loans for extending and improving telephone service in the rural areas of six states were approved by the Rural Electrification Administration, during the week of Apr. 19-23. Details of the loans follow:

Ballard Rural Telephone Cooperative Corp., Inc., La-Center, Ky., on Apr. 19, $402,000 second loan to this borrower.

These loan funds will be used to provide facilities, including 77 miles of line, to serve 146 subscribers not included in the original loan. The loan will also cover increased construction costs incurred since the first loan of $804,000 was approved in November, 1951, and enable the cooperative to serve the area in and around Lovelaceville.

The two REA loans will make it possible for the Ballard cooperative to serve a total of 2,359 rural families and establishments. Dial central offices for the new system will be located at Wickliffe, Bandana, Barlow, Gage, Kevil and LaCenter. Under present plans, subscribers will be able to call among all of the six exchange areas without toll charge.

The completed system will consist of 438 miles of line in Ballard and MacCracken counties. Wilson Rudolph is president, and James H. Whipple is manager of the Ballard Cooperative Corp.

* * *

East Ascension Telephone Co., Inc., Gonzales, La., Apr. 21, $125,000 third loan to this borrower.

These loan funds will be used to provide facilities, including 44 miles of line, to serve 68 subscribers who were not provided for in previous loans. The loan also will permit an increase in the number of private, semi-private and 4-party lines, and cover increased construction costs incurred since the first two loans, totaling $465,000, were approved.

The initial system of East Ascension as proposed in the first two loans has been completed. The Gonzales exchange has been cut over to dial, and about 950 subscribers are now receiving dial service.

On completion of the entire system, the borrower will be operating a 214-mile system in Ascension parish, furnishing service to 1,568 rural families and establishments. Mrs. Anona C. Banker is president of the East Ascension company.

* * *

Hebron's Home Telephone Company, Hebron, Me., on Apr. 21, $12,000 third loan to this borrower.

Funds from this loan will complete the construction authorized in the first two loans. The REA loans, totaling $124,000, will enable the Hebron's Home Telephone Co. to serve about 230 subscribers over 55 miles of line in Oxford and Androacoggin counties. A. W. Morgan is president and manager of Hebron's Home company.

* * *

East Ozark Rural Telephone Co., Inc., Bloomsdale, Mo., on Apr. 21, $194,000 to improve and expand rural telephone service in Ste. Genevieve County.

The applicant, a newly organized mutual company, has an option to purchase for a nominal amount the Bloomsdale Local Telephone Co. now furnishing magneto service to 204 subscribers over 62 miles of line. The borrower proposes to install new dial facilities in the Bloomsdale central office, rebuild 55 miles of the acquired line, and add 87 miles of new line.

These improvements will enable the East Ozark Co. to bring improved service to the existing subscribers and service for the first time to 238 rural families. Present subscribers of the company include 87 rural families now being switched by the Bloomsdale Local Telephone Co. who will abandon their lines and become regular subscribers of the new borrower.

The completed system will consist of 142 miles of line. Marvin H. Drury is president of the East Ozark company.

* * *

Golden West Telephone Cooperative, Inc., Quinn, S. D., on Apr. 21, $746,000 to improve and expand rural telephone service in Pennington, Jackson, Meade and Haakon counties.

The new cooperative plans to acquire the telephone properties of the Cheyenne Valley Telephone Co. at Wall, the Western Telephone Co. at New Underwood and the Homestead Telephone Co. at Owanka. These facilities are now serving 366 subscribers, including 90 switchers. The companies operate 300 miles of line.

The loan funds will be used primarily for the improvement and expansion of the existing facilities. Approximately 670 miles of new line will be constructed and new dial central office facilities installed at Creighton, Wall, Quinn, Wicksville and New Underwood. The rehabilitation and expansion will enable the Golden West cooperative to bring improved service to the existing subscribers and initial service to 543 unserved subscribers. Also the cooperative will provide switching service for 61 rural families owning their own lines.

The completed system will consist of 687 miles of line. Ingebert G. Fauske is chairman of the Golden West cooperative.

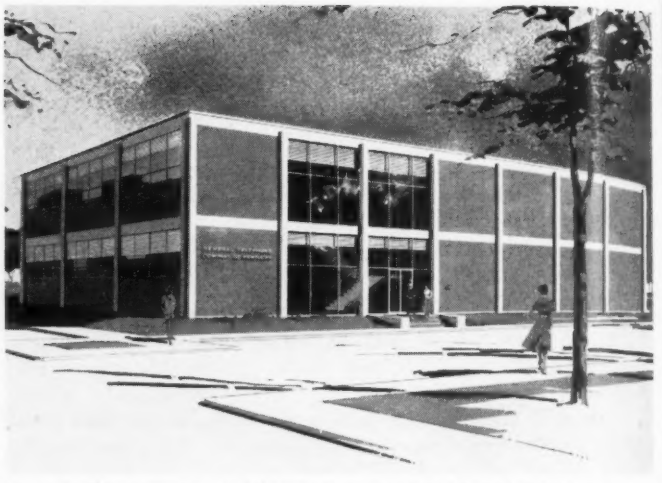
* * *

Scott County Telephone Cooperative, Gate City, Va., on Apr. 21, $170,000 third loan to this borrower.

These loan funds will be used to provide facilities, including 156 miles of line, to serve 412 subscribers not included in prior loans. In addition, the funds will provide for more than double the number of private, semi-private and 4-party lines.

With the three REA loans, totaling $745,000, the Scott County cooperative expects to construct a modern system to serve 1,612 subscribers. Dial central offices for the system will be located at Clinchport, Duffield, Nickelsville, Dungannon, Ft. Blackmore and Williams Mill. Prior loans provided for calls without toll charge among all of the exchange areas. The new loan will make it possible for all subscribers in the system to call Gate City, the county seat, without charge.

The completed system will consist of 426 miles of line in Scott County. Rufus Rollins is president of the Scott County cooperative.



Above (left): DONALD C. POWER, president of the General Telephone System, breaking ground at Ashland, Ky., for the General Telephone Co. of Kentucky new dial building to be erected there. (Note: the usual shovel has been replaced by a steam shovel.) It is estimated that the entire project will involve an expenditure of approximately 3 million dollars and will be completed in the third quarter of 1955. Right: General of Kentucky's Olive Hill exchange, recently converted to dial operation. Approximately 560 stations were cut over to Leich CDO equipment which replaced magneto service. A records control office has been established at Morehead with a collection agent at Olive Hill to handle local business.

Executive Changes Effected at Lincoln (Neb.) T&T

Several changes in executive and managerial positions of The Lincoln (Neb.) Telephone & Telegraph Co. have been announced by Merle M. Hale, vice president. They were effective May 1.

John A. McKinzie, general plant superintendent, retired after 39 years with the company and was succeeded by George P. Barney, formerly assistant to the general plant superintendent.

J. A. McKINZIE

Max C. Walker, formerly eastern district manager, succeeded Mr. Barney; and Paul H. Henson, formerly transmission and protection engineer, became eastern district manager.

After working with the telegraph construction department of the Burlington Railroad for eight years, Mr. McKinzie joined Lincoln T&T in December, 1915, as a clerk in the general plant office. He then served on the staff of the general plant superintendent in various outside plant assignments and in 1918 became plant statistician. In 1921 he was appointed chief clerk in the construction department and two years later was advanced to supervisor of supplies, having charge of the purchase of all materials and equipment used by the company. He was named eastern district manager in 1929 and advanced to general plant superintendent in 1951.

G. P. BARNEY

Active for many years in the United States Independent Telephone Association, Mr. McKinzie is a member of its Plant Committee and is a familiar figure on programs of the USITA and the Nebraska Telephone Association. He is also a member of the Frank H. Woods chapter of the Independent Telephone Pioneer Association.

Mr. Barney also started with Lincoln T&T in 1915 when he was employed as a groundman at Lincoln. Later that year he was transferred to the supply department as a clerk and then became general storekeeper and shopman. In 1919 he was transferred to the Lincoln plant department as a combinationman and in 1925 became office foreman at one exchange. He was appointed chief clerk in 1939 and became assistant to the general plant superintendent in 1941. He is a member of the Frank H. Woods chapter of the Independent Telephone Pioneer Association.

Mr. Walker began his telephone career in Lincoln as an apprentice switchman in September, 1926. However, most of his service with the company has been spent at Hastings. He moved there in 1929 as a switchboardman and became wire chief in 1939. In 1948 he returned to Lincoln as central district plant manager. He was appointed eastern district manager in 1952. Mr. Walker is president of the Frank H. Woods chapter of the Independent Telephone Pioneer Association.

P. H. HENSON

Mr. Henson entered the telephone business as a warehouseman at Lincoln

in 1942. In 1943 he entered military service and was a first lieutenant with the 14th Air Force in the Pacific area. He returned to the company in 1946 as a warehouseman and became an advanced clerk in the general traffic department later that year. He was named equipment engineer in February, 1948, and in July, 1948, became junior engineer in the engineering department. He was appointed transmission and protection engineer in 1949. A graduate of the University of Nebraska with a Master of Science degree, he is a member of the Society of Professional Engineers.

V V

BOOK REVIEW

"ELECTRONICS: A TEXTBOOK FOR STUDENTS IN SCIENCE AND ENGINEERING," by Thomas B. Brown. 545 pages. Price $7.50.

The new book is devoted to fundamental concepts and principles, with emphasis on the physical interpretations of electron tubes and circuits.

Dr. Brown, professor of physics at George Washington University, keeps the discussion of circuits as simple as possible, in order to avoid the confusion of basic electronic theory with circuit theory. However, he develops more fully those theories that concern physical processes inside electron tubes.

Descriptions of laboratory and demonstration experiments are featured as an integral part of this text, and include such original graphical analyses as that given for Eccles-Jordan (flip-flop) circuits.

The author also gives special consideration to the non-linear functions performed by electronic circuits, and treats the modulation processes, which include detection and frequency conversion, in a systematic manner in order to bring out the common relationships. A chapter devoted exclusively to UHF electronics, covers such special tubes as klystrons, magnetrons, and traveling-wave tubes.

Professor Brown has 35 years teaching experience. During World War II, he also served as a physicist in the fields of electronics and magnetics at the Naval Ordnance Laboratory.

This book may be purchased through TELEPHONY.

Answers to Questions On Page 34

(1) Is.
(2) Equals.
(3) Resistance.
(4) Electromotive force.
(5) Amperes.

TELO-CATER*

Patent No. 2142304-Pat. pending *Reg. U. S. Trade Mark

1. **Locates shorts, crosses, grounds and opens in cable, drops and aerial wire without necessity of climbing poles.**
2. **Cuts trouble shooting time and gas mileage.**
3. **Identifies pairs in cable.**
4. **Locates buried conduit, water and gas pipes.**
5. **Locates concealed wiring between walls in building.**

How the TELO-CATER works:

You attach your cable tone to your troubled line either in the office or in the field with your line tapper; then you follow the tone with the TELO-CATER until the tone either stops completely or greatly diminishes. This is where your trouble is and it can be located within an inch. You can locate most troubles in open aerial wire without leaving your car. Ordinarily if the trouble is in cable you will have to extend your exploring core closer to the cable than you would in either drop wire or open aerial wire.

Trouble in drops

Trouble in drops may be easily and quickly located by listening for the tone at each drop to see if the tone has gone by or stopped there. If the tone is heard in the drop and enters the house you know the trouble is inside the house. You simply follow the tone until it stops or greatly diminishes, that is where your trouble is located. The TELO-CATER can be used with most regular tone generators.

Complete TELO-CATER unit and attachments

Simple design

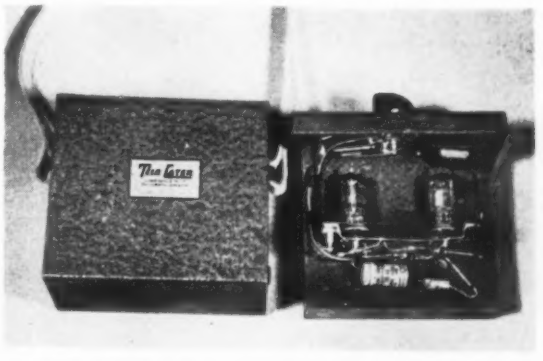
The TELO-CATER unit consists of a vacuum tube amplifier contained in a metal cabinet finished with a baked slate gray crackle enamel finish. Two exploring coils, one mounted with a short length of composition tubing for a handle, the other fitted with a ferrule to fit a 1¼" standard tree trimmer extension section with 20 feet of shielded cable for plugging into the amplifier unit and a line tapper also adapted to fit the 1¼" tree trimmer extension section.

Maintenance and repair

The TELO-CATER very seldom gives any trouble, but if trouble develops the unit should be returned to the factory. It will be repaired for a nominal fee and returned in ten days.

Order direct

All TELO-CATER units are sold with strictest satisfaction guarantee. All orders are shipped direct from the factory. Write or phone for prices and delivery schedule.



TELO-CATER unit open to show simplicity of design. Pilot light indicates when the set is on.

CUMMINGS & NOTT

Philomath, Oregon

news on new PRODUCTS

TRANSMISSION FOR SIDE-MOUNTED POWER TAKE-OFF—Tel-E-Lect Products, Inc., has designed a heavy-duty transmission control for earth boring equipment. It is designated the T-31 transmission.

It provides many useful applications of speed and rotation when used with a side-mounted power take-off on an ordinary truck transmission. It can

also be used for control of such auxiliary equipment as winches, hydraulic pumps, farm equipment, sprayers and other uses.

Included are such features as a push-pull shift control; heavy-duty bearings; hardened 1 inch face, 6/8 pitch gears; hardened 1¼ inch diameter shifts; extra strong gear case. Specifications, per 100 rpm: low-.67; high-1.67; H.P.—5.1. Request NP 270.

PUNCH CARD TRANSMITTER—Development of the first punched card transmitter that "talks" over regular telephone circuits at the rate of almost 1,000 alphabetic or numeric characters a minute has been announced by International Business Machines Corp.

Also capable of checking the accuracy of its rapid-fire "conversations" by listening in on them, this new development insures the exact, fast duplication of punched card data between points thousands of miles apart.

Utilizing the widespread telephone and telegraph networks to link these new card transmitting and receiving units, this machine now makes possible the swift transmission of accounting

data from decentralized branch office and plant locations to any central point such as a company headquarters. Known as the IBM Transceiver, the

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5/8/54

Construction and
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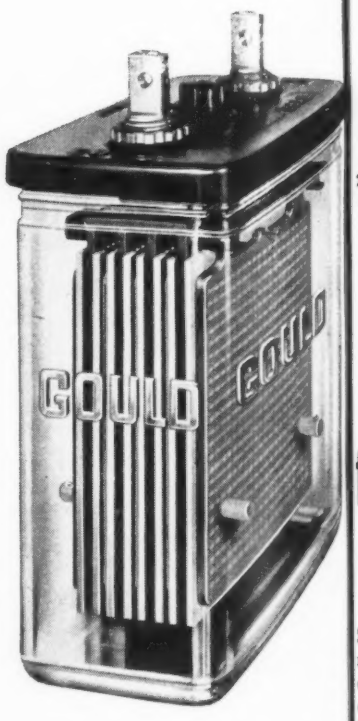
the aristocrat of stationary batteries



Many Planté batteries are still in active float service after twenty, thirty, even years! That's because Planté plates heavy, solid sheets of pure lead. In batteries Gould has eliminated the prim cause of self-discharge, capacity losses shortened battery life. Cut maintena charging and replacement costs to a mum. Choose Planté.

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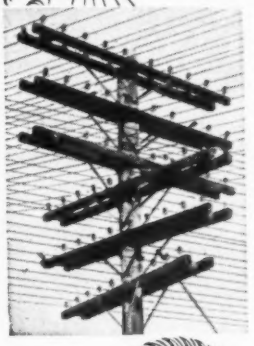
...ID AMERICA'S
...ANUFACTURERS

"dependable" *means both the trade-mark & the guarantee of cross-arms by*

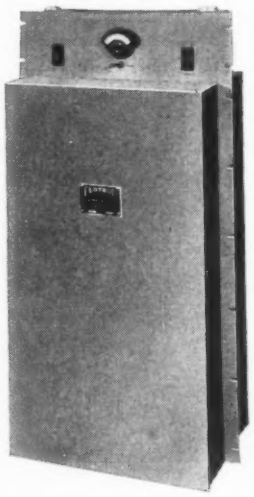
American Cross-Arm Inc.



The finest pole and wire installation is useless if cross-arms fail. "Dependable" Cross-Arms are all that the name implies—made of sturdy, American woods, long seasoned, fashioned and finished to stand every weather condition from desert heat to mountain blizzards.

In Douglas Fir—Creosoted Yellow Pine or Gulf-Red Cypress.

no moving parts—and constant within ±1%!



Model 1200 B 24 Amps. 50 Volts

flotrol automatic battery charger

Since operation of the FLOTROL does not depend on tubes, relays, motors or other "expendable" equipment, its dependability is outstanding. In performance record tests, amazing accuracy of voltage regulation has been recorded even when the supply voltage ranged from 105 to 125 volts, and the load varied from less than 10% to over 100% of rated value.

Complete overload protection is automatic with FLOTROL. Even if connected to a discharged battery, component parts remain undamaged.

WRITE for Bulletin 160—a complete catalog of FLOTROL Models for single-phase operation.

Mfd. by Cook Electric Co.

something new in sub-station

protectors

The Cook type RO-9u Sub-station protector has a rugged all-metal housing in which are mounted the A-9u 7 amp. fuses and the line and surge arresters.

This protector meets all requirements of the Underwriters' specifications and is listed by the Underwriters' Laboratories.

Insulation is of high impact bakelite, and secondary surge arresters furnish high voltage protection when fuses are blown or removed.

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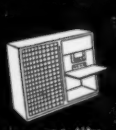

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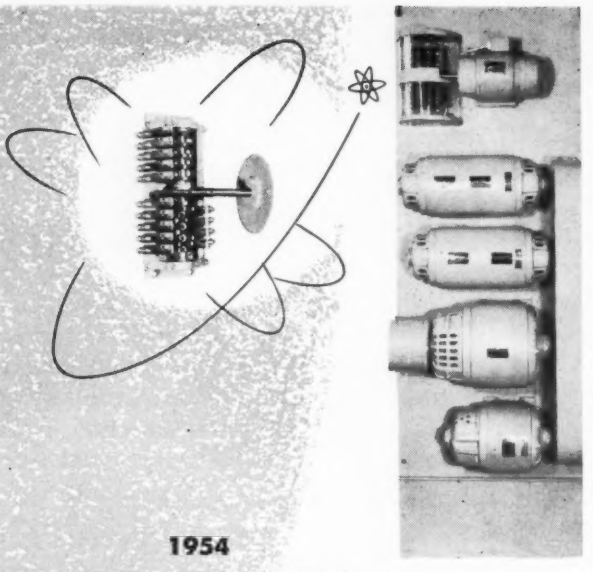
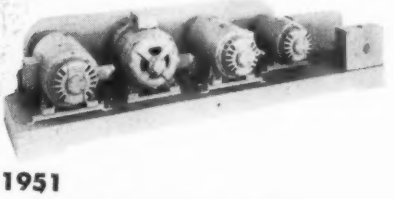


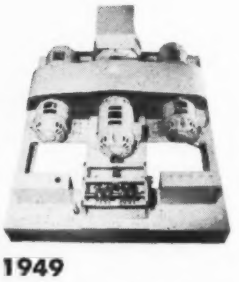
1954

Mar Vista, California. All connections at terminal board. Lubricated-for-life ball bearings throughout. Rugged, dependable construction. Equipped with coin controls — PLUS — A new and improved interrupter design. The pile-up is equipped with positive micro setting control of finger positioning. Another exclusive with ESCO



1951

Clarinda, Iowa. Simplified hook-up



1949

Oxnard, California. Improved interrupter design

1947

Rochester, New York. A new, better motor generator set

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GENERATORS ★
CONVERTORS ★
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ELECTRIC SPECIALTY CO.
176 SOUTH STREET, STAMFORD, CONN.

Specify ESCO when ordering ringing equipment.

same unit is used for transmitting and receiving on a fully automatic basis.

The Transceiver, for the first time, provides a transmission method employing normal telephone circuits for remote punching of cards and has been designed with checking features capable of meeting the critical standards of accounting and computing accuracy.

When information is to be sent to a distant point, the Transceiver reads the data recorded in IBM cards in the form of punched holes. As the cards are being read, electronic circuits generate coded impulses in the form of "beeps," each series of sounds representing a hole in the card. These sound signals actuate the punching mechanism in the distant receiver which simultaneously creates exact duplicates of the cards being transmitted. The newly-created punched cards then become immediately available for accounting machine and computer processing.

Each hole transmitted is checked automatically, and after each card is completed the transmitter sends a signal which checks on the accuracy of the data reproduced by the receiver. This signal will "echo" back if the card has been punched correctly and cause the transmitter to proceed automatically with the next card.

When the machines are linked by telephone lines, 16 card columns of data can be transmitted and received every second and four separate transmittals can be sent simultaneously over the same wire. When linked by telegraph lines, over which one transmission at a time can take place, the transmitting speed is six columns a second.

A representative of the company said that the Transceiver has been tested between air force installations with a high degree of success. A well-known aircraft manufacturer also is conducting tests of the device between one of its laboratories and its electronic computing bureau, where the data received is fed into a 701 Electronic Data Processing Machine, latest of the IBM "giant brains." Request NP 271.

• • •

MICROWAVE RADIO SYSTEM — New microwave radio systems capable of transmitting 72 telephone channels are now being delivered by the Lenkurt Electric Co.

The new equipment, known as Type 72B, will transmit groups of up to 72 channels with noise and cross-talk performance comparable to that obtained with commonly used wire-line and cable carrier systems. Single-section systems can be operated economically between terminals as little as 10 or 15 miles apart; with multi-section

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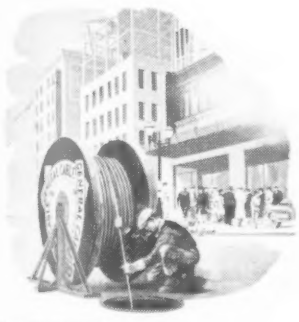
Paper Telephone Cable



UNDERGROUND

AERIAL

SUBMARINE

BILLIONS OF PAIRED FEET ALREADY ON THE JOB

The country's only supplier of a complete line of telephone wires and cables, General Cable has, for more than 25 years, been the prime independent supplier of paper telephone cables to the independent telephone companies.

Measuring this fact another way, many billions of paired feet of our paper telephone cable are currently in service for aerial, underground, and submarine installations. Consider this as evidence, if you will, of complete dependability under every type of operating condition.

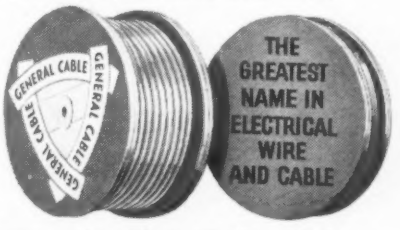
For full-line availability of paper telephone cable, check these General Cable types:

Aerial and underground duct service...paper insulated with lead sheath.

Direct earth burial...paper insulated, lead sheath, with jute or steel tape armor and jute.

Submarine installation...paper insulated, lead sheath, with round steel wire armor and jute.

All of the above types are manufactured in small sizes with concentric and in large sizes with unit construction. Composite and quad constructions available.



For information and service please refer to our national distributors:

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ENERAL CABLE CORPORATION 420 Lexington Avenue, New York 17, New York

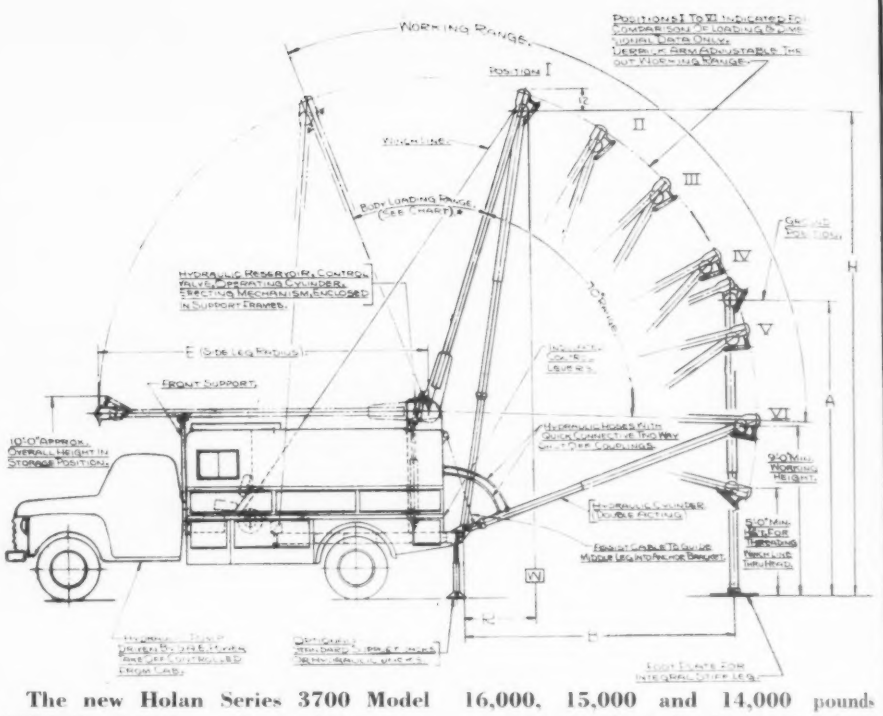
Sales Offices: Atlanta • Buffalo • Cambridge (Mass.) • Chicago • Cleveland • Dallas • Detroit • Greensboro (N. C.) • Houston • Indianapolis • Kansas City • Los Angeles • Milwaukee • Minneapolis • New York • Newark (N. J.) • Philadelphia • Pittsburgh • Portland (Ore.) • Rome, N.Y. • Rossmoyne, O. (Cincinnati area) • St. Louis • San Francisco • Seattle • Syracuse • Tulsa • Washington, D. C.

systems using suitable carrier equipment, end terminals may be located as much as 600 miles apart.

When used with the presently available Lenkurt 45BX carrier equipment 48 channels can be transmitted over the microwave system. A larger capacity carrier system to provide 72 channels on a single 72B system is being developed for future delivery.

Type 72B equipment, which is a further development of an earlier 36-channel microwave system, is designed for operation at any frequency between 890 and 936 megacycles. Standard operating frequencies have been allocated so that up to three systems (ultimate 216-channel capacity) can be operated between two points over a single path. Up to six systems can be terminated at a single point when different directions of transmission are used. Request NP 272.

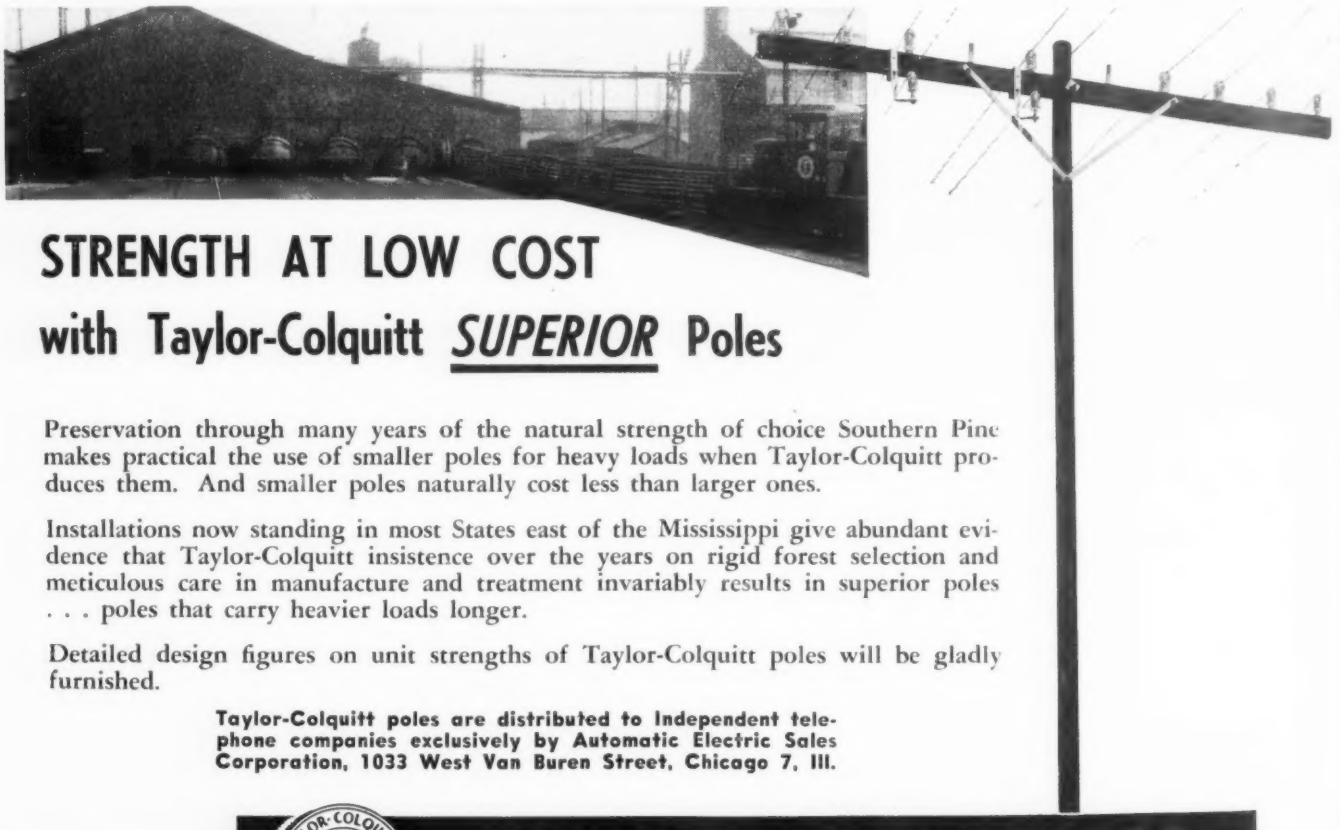
• • •



HEAVY-DUTY DERRICK — The Holan Corp. has completed a new "Live Boom, Heavy Duty Derrick" of 12,000-pound capacity—designed to meet the utility industry's demands for a piece of equipment that can erect 70-foot poles with ease, remove poles from the toughest ground, and load heavy equipment onto the body space.

The new Holan Series 3700 Model "HL" Derrick is made in three sizes. A difference of 1,000 pounds integral stiff leg and maximum capacity distinguishes the "HL" 22, the "HL" 24 and the "HL" 26 "Series 3700 Derrick." Maximum capacity reaches 12,000, 11,000 and 10,000 pounds respectively, and integral stiff leg capacity reaches 16,000, 15,000 and 14,000 pounds respectively. Body loading and unloading capacity of 5,000 pounds remains the same in each of sizes.

The power for operating the Holan Series 3700 Model "HL" Derrick is provided by a hydraulic pump driven by a power take-off mounted on the truck transmission. Control knob on



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Preservation through many years of the natural strength of choice Southern Pine makes practical the use of smaller poles for heavy loads when Taylor-Colquitt produces them. And smaller poles naturally cost less than larger ones.

Installations now standing in most States east of the Mississippi give abundant evidence that Taylor-Colquitt insistence over the years on rigid forest selection and meticulous care in manufacture and treatment invariably results in superior poles . . . poles that carry heavier loads longer.

Detailed design figures on unit strengths of Taylor-Colquitt poles will be gladly furnished.

Taylor-Colquitt poles are distributed to Independent telephone companies exclusively by Automatic Electric Sales Corporation, 1033 West Van Buren Street, Chicago 7, Ill.

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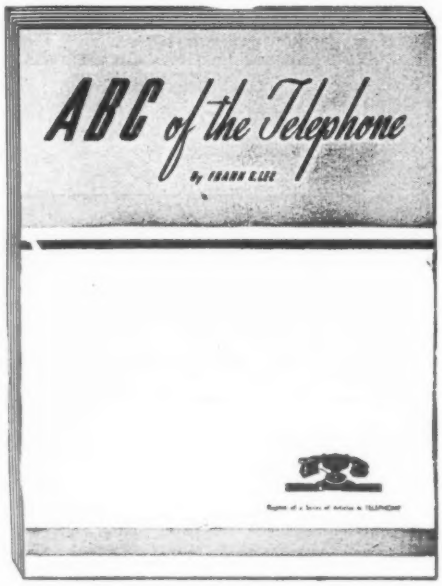
Here are the books to help you with your plant training problems.



Do as hundreds of other telephone companies do—give each plant man copies of Vol. I and Vol. II of "ABC OF THE TELEPHONE."

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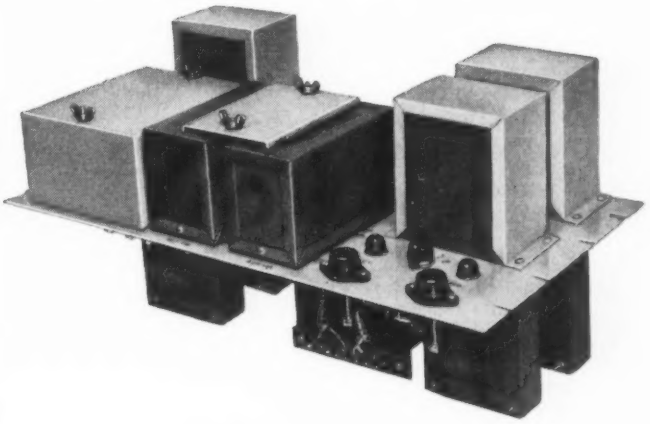
The ABC books can be used as a textbook for a preliminary, semi-technical telephone training course in your local high school or college.

ANOTHER C-D "FIRST"



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- **Delivers continuous-duty sine wave regulated power up to 350 watts at 115 volts, 60 cycles from an input of 48 volts DC.**
- **Compact, requires minimum panel space.**
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- **Incorporates input line filter.**

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"DOLLAR-SAVER" DISCHARGE BLOCKS
Self-grounding, self-restoring, rarely need replacement. Save costly trips after storms.

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Solid aluminum. Keeps trouble-causing dust and rain out.

SPEEDY-MOUNTING BRACKET
Just two screws fasten Type 18 to wall. Terminals easy to reach.

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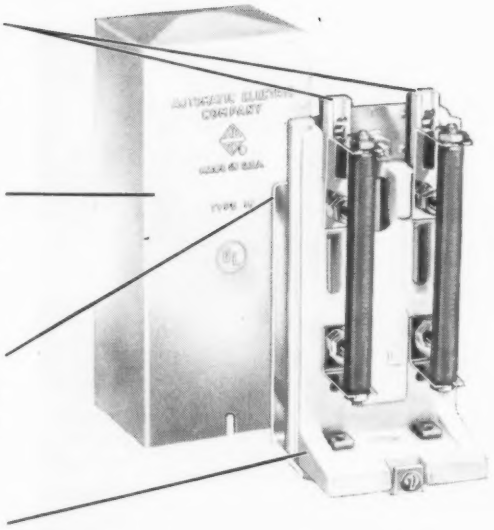
Heavy porcelain. Stands hard service. Helps insure long protector life.



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Cat. No.	Dimensions	Fuse	Shipping Wt.
SB-18	2¾"x7½"x2¾"	7 amp.	2¼ lbs.

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dash engages power take-off to drive pump. Automatic throttle control provides unattended proper pump operation under load. Complete derrick operation — erection, stowing, lifting, pulling, and loading or unloading — is controlled by one man standing at left rear side of body where the super-sensitive control levers are located. This construction design affords operator maximum visibility and safety. As added safety features, these control levers are insulated and extend away from the body. They are not confined by hazardous compartments or doors, the company states.

The Holan Series 3700 Model "HL" Derrick operating mechanism is completely enclosed and concentrated into a minimum of space. The danger of overloading the derrick is eliminated by the utilization of pressure relief valves which are automatically activated when load exceeds capacity. The entirely new mechanism with rigid link type connections affords positive control in erection or stowing. Erection can be accomplished in approximately 30 seconds and stowing in 40, it is said.

The wide 195° working range of the new Holan 3700 Derrick permits the boom to be lowered to a 5-foot height. A man standing on the ground can thread winch cable through derrick head. Center leg (double acting hydraulic cylinder) is detached from body and swung to ground for stiff leg position.

In loading heavy equipment onto the body floor space, the center leg is placed in forward derrick position. Equipment up to 5,000 pounds can be lifted off the ground and carried 4 to 7½ feet inside the body completely controlled at all times. In stowing the center leg is swung against one of the rigid type side legs (no pins) and is held by a fast acting clamp. This new method of stowing center leg affords speed and leaves valuable body space free for loading, the company states. Request NP 273.

• • •

SOLDERING TOOL—The Stark Mfg. Co. recently announced its Model 101 Solder-Quik, designed for light, fast soldering on small work. Operating from regular 110-volt ac line through a step-down transformer, the Solder-Quik is said to be both safe and highly efficient.

Soldering heat is obtained at the tip of the Solder-Quik by passing low voltage current through a small area of the work by means of two long-life carbon electrodes. Six heat ranges are available through a simple plug-in feature.

Features of the Solder-Quik Model 101 are said to be its very light weight, accessibility to small spaces, and low power consumption. Request NP 274.

V V

I. T. Bennett Named Chairman Of General Cable Corp.

Election of Irving T. Bennett as chairman of the board of General Cable Corp. was announced by the company on Apr. 15. He will continue also as the company's chief executive officer, a position he has held since

I. T. BENNETT

August, 1953. As chairman, he succeeds D. R. G. Palmer who is retiring after 35 years with General Cable Corp. and its predecessor companies.

Mr. Bennett joined General Cable in April, 1953, as a director and chairman of the executive committee. Previously, he had been vice president and general manufacturing manager as well as a director of Revere Copper & Brass Inc. which he joined as sales promotion manager in 1929. From 1944 to December, 1952, he had been vice president in charge of the Baltimore and aluminum divisions of Revere.

Although Mr. Bennett holds a bach-

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DROP WIRE WITH NEOPRENE JACKET, No. 18 COPPERWELD CONDUCTORS

Now you can have the longest lasting, neatest drops you've ever strung . . . and at less cost too.

Alphaduct's dumbbell or figure eight construction provides the best protection for the conductors, and is the easiest to install of all the neoprene jacketed drop wires. The No. 18 Copperweld is 20% stronger than No. 17 bronze.

Alphaduct's tough neoprene jacket protects the insulation against sunlight, moisture, oil, acids, abrasion, etc. Each conductor has the same thickness of rubber insulation and neoprene jacketing as it does in twisted pair construction. The dumbbell shape permits splitting the wire without damage to insulation or neoprene jacket on *either* conductor.

Try this remarkable Alphaduct dumbbell drop wire. It's step-tested during manufacture, dated, so you can tell how long it lasts and carton packaged for your convenience and protection. Order today from the distributors listed below.

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PANKEY SUPPLY COMPANY, CHARLOTTESVILLE, VA.

elor degree in metallurgy and a master of science degree in metallography from Yale University's Sheffield Scientific School, he has devoted much of his business career to sales work. After three years as Revere's sales promotion manager, he was transferred to Revere's Rome (N. Y.) division where he founded the company's technical advisory service to customers, which has become a major sales adjunct. Later he was named assistant sales manager in charge of industrial sales.

Because of his sales, technical and manufacturing experience, Mr. Bennett was chosen in 1943 to become general manager of Revere's expanded light metals development in Baltimore and was elected vice president in charge, the following year.

During his eight years as head of Revere's Baltimore operations, Mr. Bennett built up aluminum production and sales facilities and expanded the output of copper and brass products in that division.

Mr. Bennett was a member of the Aluminum & Magnesium Advisory Committee for the War Production Board and the Army Industrial College. He was also a member of the Prime Aluminum Products Industry Advisory Committee of NPA and a director and vice president of the Aluminum Association.

Mr. Bennett was born in Stratford, Conn., and first entered the copper industry in 1918 in Bridgeport. Following his graduation from Yale, he went to work for the Metropolitan Engineering Co. of Brooklyn and, while holding this position, worked toward his master of science degree which he received in 1923.

V V

OBITUARY

ROGERS CASE, 66, founder of Transandean Associates, Inc., Transandean Construction Co., and Transandean Canada Ltd., died at Orange, N. J., on Apr. 28.

Mr. Case, who began his communications career many years ago when he left his father's farm in Bristol, R. I., to join a passing crew of telephone linemen, developed an international telephone empire with ventures which began 38 years ago in the republic of Colombia, S.A.

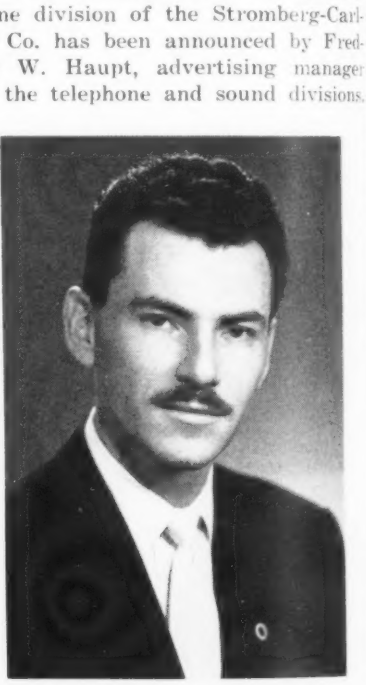
It was he who built the first full-scale telephone system over the Colombian Andes to connect the capital city of Bogota with Buenaventura, the Pacific Coast seaport (TELEPHONY, Apr. 24, p. 83). He also originated the Case transposition brackets.

Mr. Case was educated at Andover Academy and Brown University. He is survived by his widow, Ethel Westman Case; a son, Rogers Jr., who has been associated with his father in the business; and two daughters, the Misses Lita L. Case of Orange and Muriel R. Case of London.

V V

Stromberg-Carlson Names Three Technical Writers

Appointment of Jacques S. Herman, William J. Belleville, and William J. Synal as technical writers for the telephone division of the Stromberg-Carlson Co. has been announced by Frederic W. Haupt, advertising manager for the telephone and sound divisions.



J. S. HERMAN

W. J. BELLEVILLE

They will be engaged in writing technical manuals, instruction books and similar literature for the telephone di-

vision of the company, principally in the field of government contracts.

Mr. Herman is a native of New York City, and served in the U. S. Navy for three years during World War II. He attended New York University. For the past five years he has been with the Signal Corps Publications Agency, Fort Monmouth, N. J.

Mr. Belleville is a native of Worcester, Mass., and attended Leicester (Mass.) Academy. He is a veteran of World War I.

He has been engaged in writing for many years. From 1909 until entering the U. S. Army in 1917, he was on the editorial staff of the Worcester (Mass.) *Telegram*. After his discharge in 1918 he joined the editorial staff of the Worcester *Evening Post*, serving until 1938. Subsequently he was with the publications department of the New England Electric System for five years, and has been a technical writer for the Signal Corps Publication Agency for the past 11 years.

W. J. SYNAL

Mr. Synal was born in New Hartford, N. Y., and was graduated from the New Hartford High School. He served with the Signal Corps of the U. S. Army, in the dial central office at Fort Knox, Ky., from August, 1946, to January, 1948, and subsequently was an instructor in dial central office maintenance for the Signal Corps at Fort Monmouth, N. J. For the past year he also has been a technical writer for the Signal Corps Publications Agency.

V V

Lenkurt Carrier System Installed in Turkey

As one of the steps in a major program of modernizing and expanding internal communications, the Turkish Ministry of Posts, Telegraphs and Telephones (PT&T) recently completed installation of a Lenkurt Type 45A carrier telephone system providing 12 channels between Ankara and Sivas, Turkey.

Hicri Goceoglu, chief carrier engineer of the Turkish PT&T, supervised installation and testing of the system which was placed in operation less than two weeks after the equipment was received.

Operating over sleet-exposed open wire lines in the central portion of the country, the 250-mile system includes three repeaters at the intermediate cities of Kirikkale, Yozgat, and Akdagmadeni. All channels are equipped with compandors to assure satisfactory transmission under adverse weather conditions.

Equipment for this installation, a type introduced by Lenkurt Electric Co. during the past six months and distributed by International Automatic Electric Corp., is the first of its type furnished for installation outside North America. A number of four-channel Lenkurt carrier telephone systems and other associated equipment also have been shipped to the Turkish Ministry of PTT to provide needed communica-

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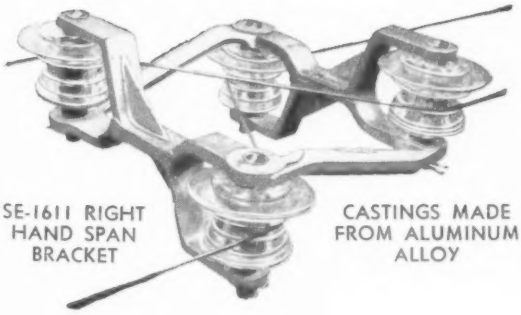

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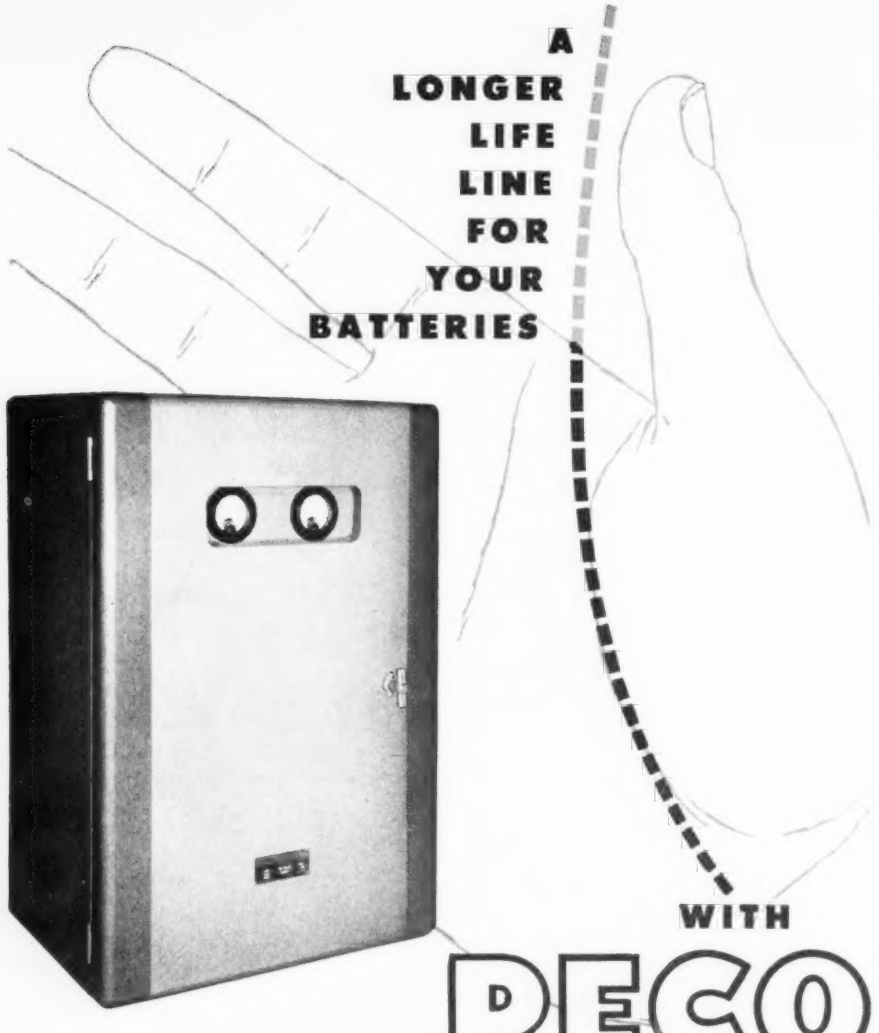

AUTOMATIC BATTERY CHARGERS
. . . FIRST with Dual Control!

Yes, longer battery life! Because PECO Chargers accurately float the control battery of any power station or substation which has a reasonably constant switchboard load; furnishes power to the load and maintains a fully charged battery, ready for any emergency.

To provide extreme accuracy of electronic control and the exceptional reliability demanded by this type of service, Power Equipment engineers designed this PEC626 type Automatic Battery Charger by starting with the rugged components of a manual charger, then added a magnetic system for coarse voltage control and a simplified electronic system for fine voltage control.

As an illustration of the accuracy of the PECO charger, this example can be used: the DC output is sufficient to maintain 60 lead acid battery cells at 129 volts; it will also furnish power to switchboard loads within the rating of the charger, and at all times the output voltage is automatically regulated to within ± 0.5 per cent, for AC line voltage fluctuations of ± 5 volts on a 230 volt circuit.

Exceptional reliability is shown by the fact that if the electronic control section should be disconnected, the magnetic control section will still automatically hold the output voltage to within ± 3 per cent of nominal voltage.

Write for complete specifications today.

POWER EQUIPMENT *Company*

Battery Chargers ☆ Battery Eliminators ☆ D.C. Power Supply Units ☆ Regulated Exciters ☆ and other Special Communications Equipment

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tions facilities in other sections of Turkey.

V V

Automatic Electric Co. Makes Sales Department Changes

Carl W. Snyder, Indiana-Kentucky sales representative for Automatic Electric Sales Corp., Chicago, is retiring at the end of April after more than 38 years service with the Automatic Electric group. The vacancy created by Mr. Snyder's retirement will be filled by Dell K. Allen, now a sales representative for Automatic Electric in Washington, D. C.

C. W. SNYDER

D. K. ALLEN

Born and raised in LaGrange, Ind., Mr. Snyder's first telephone experience was with the Northern Indiana & Southern Michigan Telephone & Telegraph Co., which had its main office in that city. After graduation from Wabash College, Crawfordsville, he returned to the company, serving successively as lineman, trouble-man, wire

chief, and switchboard maintenance man for several exchanges.

Mr. Snyder's association with Automatic Electric began in January, 1916, when he accepted a position as sales representative covering the North and South Dakota territory. During World War I he served as radio instructor of the Flying School at Wright Field, Dayton, O.

After returning to the Automatic Electric organization he was transferred to the Minnesota-Wisconsin territory, and in 1922, to the Indiana-Kentucky territory, operating out of Fort Wayne, Ind.

Dell K. Allen, a native of San Antonio, Tex., and a mechanical engineering graduate of Cornell University, joined the Automatic Electric sales organization in November, 1935. He was with the Chicago sales group for the next 2½ years, and was then sent to Houston as sales representative, serving south Texas. He has been connected with the Washington sales office since March, 1952.

V V

Reliable Appoints Don Pollock To Sales Staff

Don Pollock, formerly an instructor on carrier systems with the U. S. Signal Corps at Camp Gordon, Ga., has been appointed a member of the sales staff of the telephone division of Reliable Electric Co.

DON POLLOCK

Mr. Pollock started in the telephone field in the summer of 1944 as a groundman for the General Telephone Co. of Wisconsin, at Wausau. During the summers after 1944, through 1950, he worked as a lineman, cable splicer's helper and trouble-shooter.

In 1951, he entered the Army, going into the Signal Corps branch. He

HUBEYE BOLTS, EYES, AND NUTS

The large-radius rounded section of the HUBEYE prevents excessive localized strain on the guy, and the smoothly-rounded high sidewalls prevent concentrated strain on individual strands.

HUBEYE popularity has led to its standardization for all Hubbard attachments where time, money and maintenance are saved by elimination of the thimble.

The drop-forged eye is stronger than the rod section from which it is formed. All HUBEYE items are protected against corrosion by Hubbard Double-Dip Hot Galvanizing.

"Hang the Load on Hubbard Hardware!"

OVERHEAD

Cable Suspension Material—Wireholders Pole Seats and Balconies—Clevises Braces—Drive Hooks—Messenger Dead Ends—Extension Arms—Long Span Material—Pins—Clamps—Guards—Stubbing Bands—Guy Protectors—Guy Clamps Pole Struts—Clips—Straps—Hangers Carriage Bolts—Rings—Transposition Brackets—Eye Bolts—Pole, Corner and House Brackets—Guy Hooks—Strain Plates—Storm Guy Straps—Lags—Machine and Hubeye Bolts—Sidewalk Guys REA Telephone Hardware

UNDERGROUND

Cable Racks—Manhole Ladders and Steps Pulling-in Irons—Expanding Anchors Cable Shields—Screw Steelwing Anchors Anchor Rods—Ground Rods and Clamps

HUBBARD AND COMPANY

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ARTHUR J. SMITH (center) shown receiving a gold watch from **FRED H. ADAMI** (right), executive vice president of Diamond Expansion Bolt Co., Inc., in recognition of Mr. Smith's 50 years with the company. Mr. Smith's son, **EDMUND SMITH**, presented his father with the company's 50-year diamond-studded service pin. The company also announced recently the appointment of Milton W. Allen & Son Co., 1863 Wazee St., Denver, Colo., as representative.

attended the carrier repeater school at Ft. Monmouth, N. J., for 7½ months. Thereafter, he spent 15 months in Korea, operating voice and teletype carrier, and radio relay systems. Upon return to the United States, he was sent to Camp Gordon.

Mr. Pollock was born in La Crosse, Wis., and attended the University of Wisconsin for two years.

V V

Seven Insurance Companies Buy Cal. Interstate Securities

Perry L. Hunsaker, treasurer of the California Interstate Telephone Co., which is negotiating to dissolve the Interstate Telegraph Co. and acquire all its property and assets (TELEPHONY, Apr. 10, p. 56), reports that as of Mar. 25, the following insurance companies have purchased California Interstate company bonds and debentures:

	Bonds	*Debentures*
Massachusetts Mutual Life Insurance Co., Springfield, Mass.	$1,400,000	$ 500,000
Teachers Insurance & Annuity Association of America; to be registered in name of Dent & Co., c/o Guaranty Trust Co. of New York, N. Y.	740,000	260,000
Investors Mutual, Inc.; to be registered in name of Carothers & Clark, c/o Equitable Security Trust Co., Wilmington, Del.	590,000	210,000
The Lincoln National Life Insurance Co., Fort Wayne, Ind.	560,000	200,000
Continental Assurance Co., Chicago, Ill.	500,000	180,000
Armour & Co. employes' pension fund; to be registered in name of Cudd & Co., c/o The Chase National Bank of the City of New York, N. Y.	205,000	75,000
Bankers Life Insurance Co. of Nebraska, Lincoln, Neb.	205,000	75,000
Totals	$4,200,000	$1,500,000

V V

"It was Thomas Jefferson, himself a farmer, who once said, in effect, that if we allow government to tell us when, where, and what to plant, and when to harvest, we'll jolly well starve to death." —Olympia (Wash.) *Olympian*.